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THE HOME OF

finish

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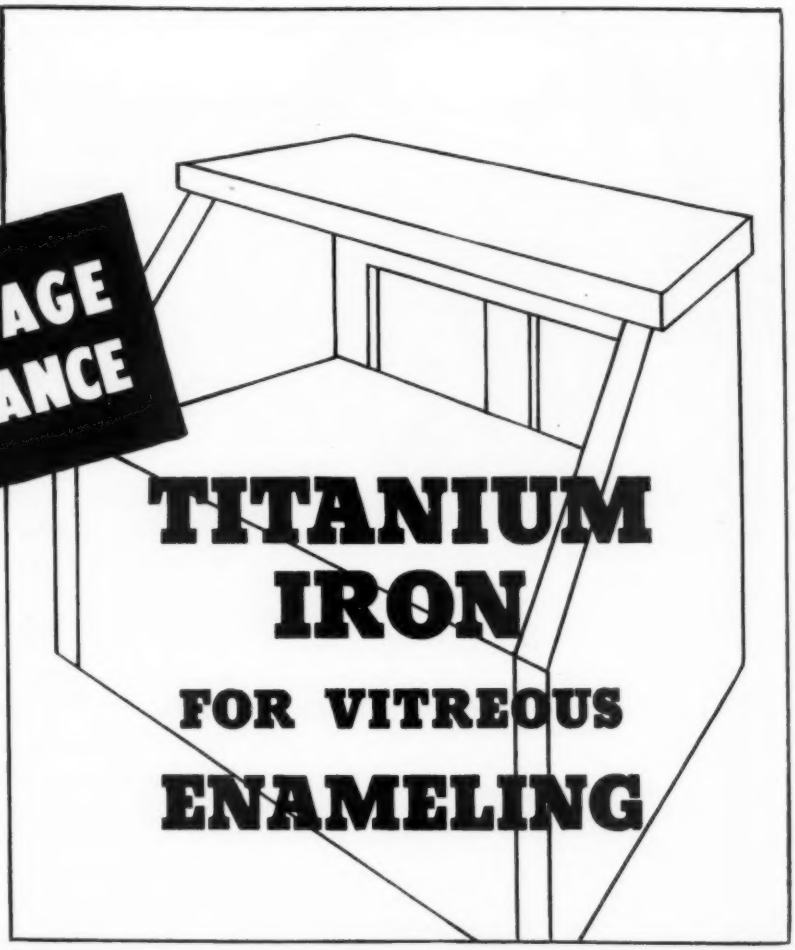
CERAMIC FINISHES ON METAL



# THINNER GAGE SAG RESISTANCE

# TITANIUM IRON FOR VITREOUS ENAMELING

ENAMELED WARE of lighter gage stock can be fabricated to desired shapes and retain a better appearance because of the increased sag resistance of Titanium iron for vitreous enameling. This particular feature is clearly demonstrated on chart at right.

Another feature is the elimination of formerly necessary ground coats. For—under proper shop conditions—the cover coat can be applied directly to the base metal. Also, these thin finishes reduce the hazards of chipping and breaking. Furthermore, at enameling heats, there is no sign of enamel boiling. During three years of both research and production experience, no case of fish scaling has been reported.

Further information is available upon request.

**EFFECT OF GAGE AND COMPOSITION ON SAGGING RESISTANCE**

| GAGE AND COMPOSITION | DEGREE OF SAG IN % |
|---|---|
| 24 Ga. Standard Enameling Iron | 100 |
| 24 Ga. Titanium Steel | 57 |
| 18 Ga. Standard Enameling Iron | 100 |
| 18 Ga. Titanium Steel | 18 |

The Titanium Alloy Manufacturing Company produces the titanium alloy used in the manufacture of this steel. For samples of this steel, see your steel supplier. Pending patent applications on the new enameling process and products made thereby are owned jointly by Inland Steel Company, and The Titanium Alloy Manufacturing Company under trust agreement.

TAM

**TITANIUM ALLOY MANUFACTURING COMPANY**

*Executive Offices: 111 Broadway, New York City  General Offices and Works: Niagara Falls, N. Y.*

# *Rotospraying...*

One of the Rotosprays in daily use at Briggs Manufacturing Co., Plumbing Ware Division, Detroit, Michigan

## is the STANDARD for PORCELAIN ENAMEL SLIP

**Yes . . . Rotospraying IS the standard method for sieving porcelain enamel slip — and this recognition wasn't earned over night.**

**Hundreds of Rotosprays have provided efficiency, dependability, and economy of operation in the world's leading porcelain enameling plants. Every enameling plant needs at least one Rotospray — and for the small shop, the equipment's ready portability is an important factor. High production plants need multiple units.**

**Time and labor saved by the use of convenient installations at point of use will pay for the equipment quickly. And, more important, using Rotosprays for all milled enamel pays rich dividends in the quality of finished products.**

**For information on the proper size for your immediate needs, write direct to Rotospray or to one of our authorized agents.**

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(Reg. U. S. Pat. Off.)
*"Worth waiting for"*

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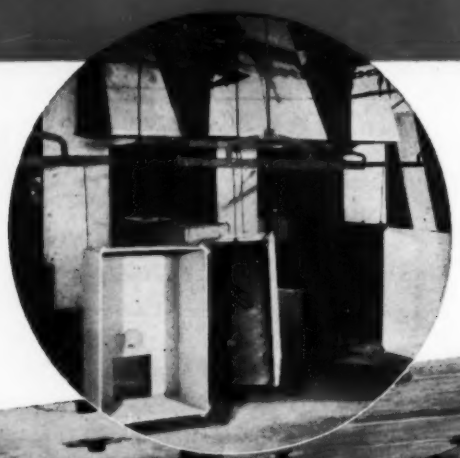
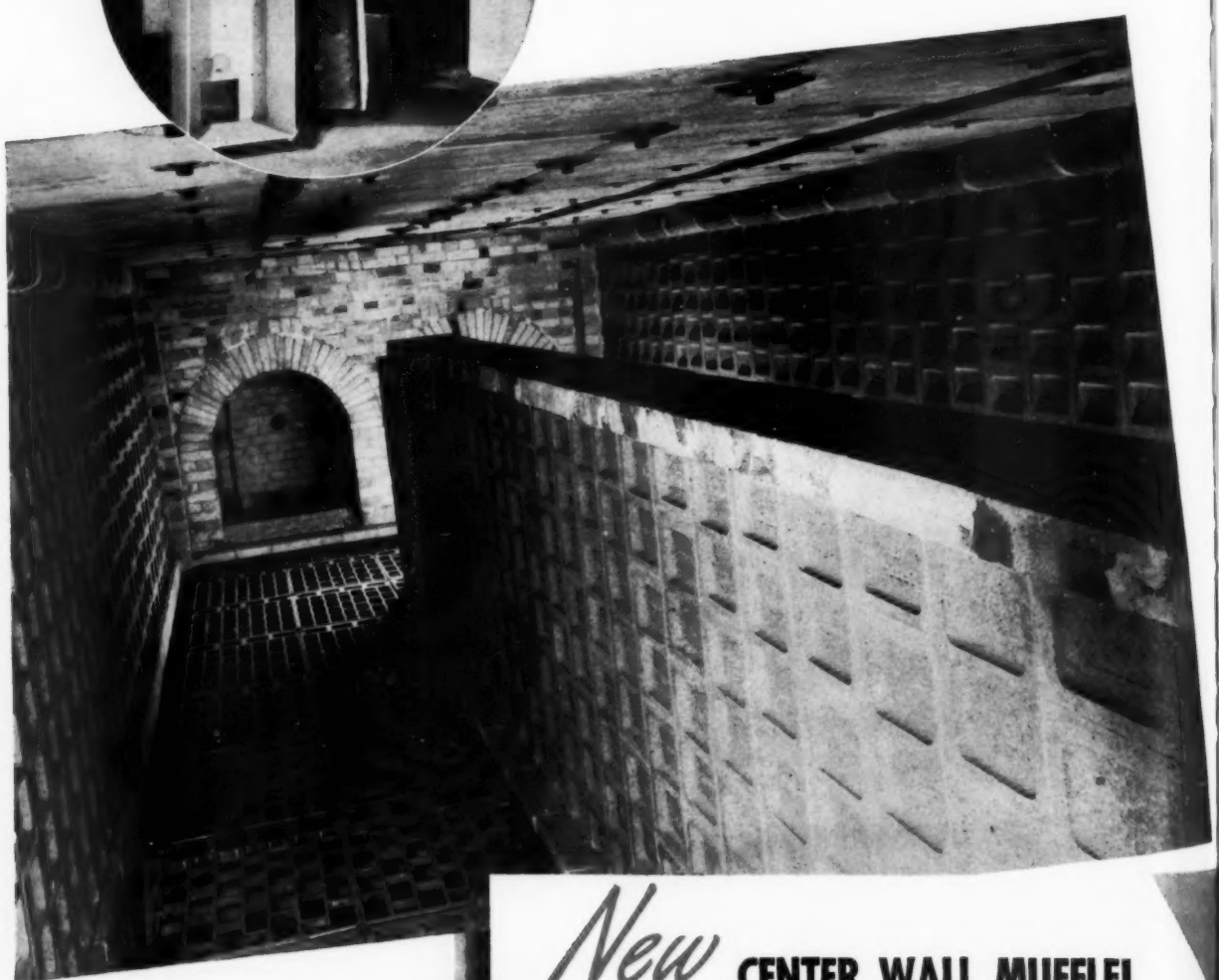
# *NEWS* about Ferro's



Ferro furnace, with center wall muffle, at Westinghouse Electric Corporation, Appliance Division, Mansfield, Ohio. (Photo below shows center wall muffle during construction of furnace.)



## *New* CENTER WALL MUFFLE!

**Provides over 40% more muffle radiation area.**

# newest "U" Type Furnace

**with**

- *Greater efficiency*
- *Lower operating cost*
- *Longer refractory life*

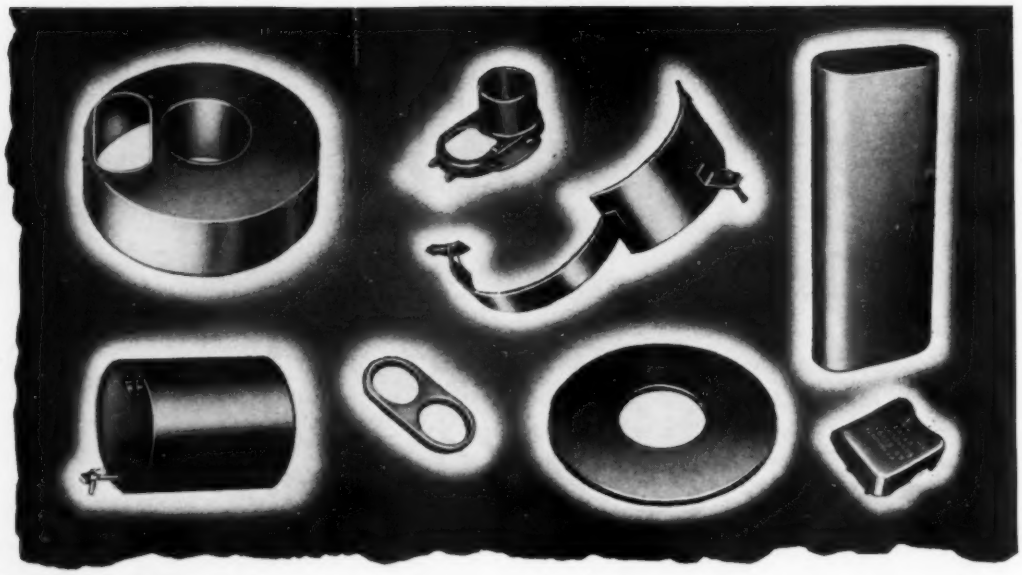
Still another Ferro first! This time a new "U"-Type furnace with center wall muffle.

This new furnace, designed and built by the same engineers who have constructed more than 89% of all modern Porcelain enameling furnaces, contains an additional 40% muffle radiation area—creating exceptional heating efficiency (through increased utilization of combustion) . . . lower operating cost . . . extended refractory life.

Let Ferro engineers tell you more about this new, tested and proved furnace with center wall muffle. Write today for complete details.

**FERRO ENAMEL CORPORATION**

4150 EAST 56th STREET CLEVELAND 5, OHIO



STOCK TANK HEATER COMPLETELY ASSEMBLED AND PACKED FOR SHIPMENT BY MONARCH

# another COMPLETELY PACKAGED UNIT...

The well known Hartung Gold Medal Oil Burning Tank Heater, which, due to its unique design and dependable working qualities, backed by New Monarch's rigid and precise construction, is today the choice of progressive farmers and stockmen everywhere, also used throughout the world by the U. S. Armed Forces.

This splendid heater is another of New Monarch's Completely Packaged units — stamped, welded, assembled, finished, and packaged for individual shipment, a feature highly desired by the manufacturer for his Distributors and Dealers. This is but another of the many services offered by New Monarch to those who find their facilities overcrowded or inadequate, depending, of course, on the availability of the material required.

MONARCH QUALITY

*When you think of Stampings, think of*

**NEW MONARCH MACHINE & STAMPING CO.**

406 S.W. NINTH STREET DES MOINES 9, IOWA

# THE CORRECT COAT

This light gauge metal can was cleaned and coated with alumina silicate coating (Krause Patents), and put into service over 4 years ago. It served as a refuse can for one year and then as a garbage can. Now after four full years of hard use it's still going strong.

Kaykote can handle the tough jobs for it is highly resistant to rust, corrosion, heat, impact, abrasion, scratch, acids and alkalis. It will pay you to investigate Kaykote now.

Spray it...
PROTECTION AGAINST CORROSION
**KAYKOTE**
LOW TEMPERATURE CERAMIC COATING
Dip it...

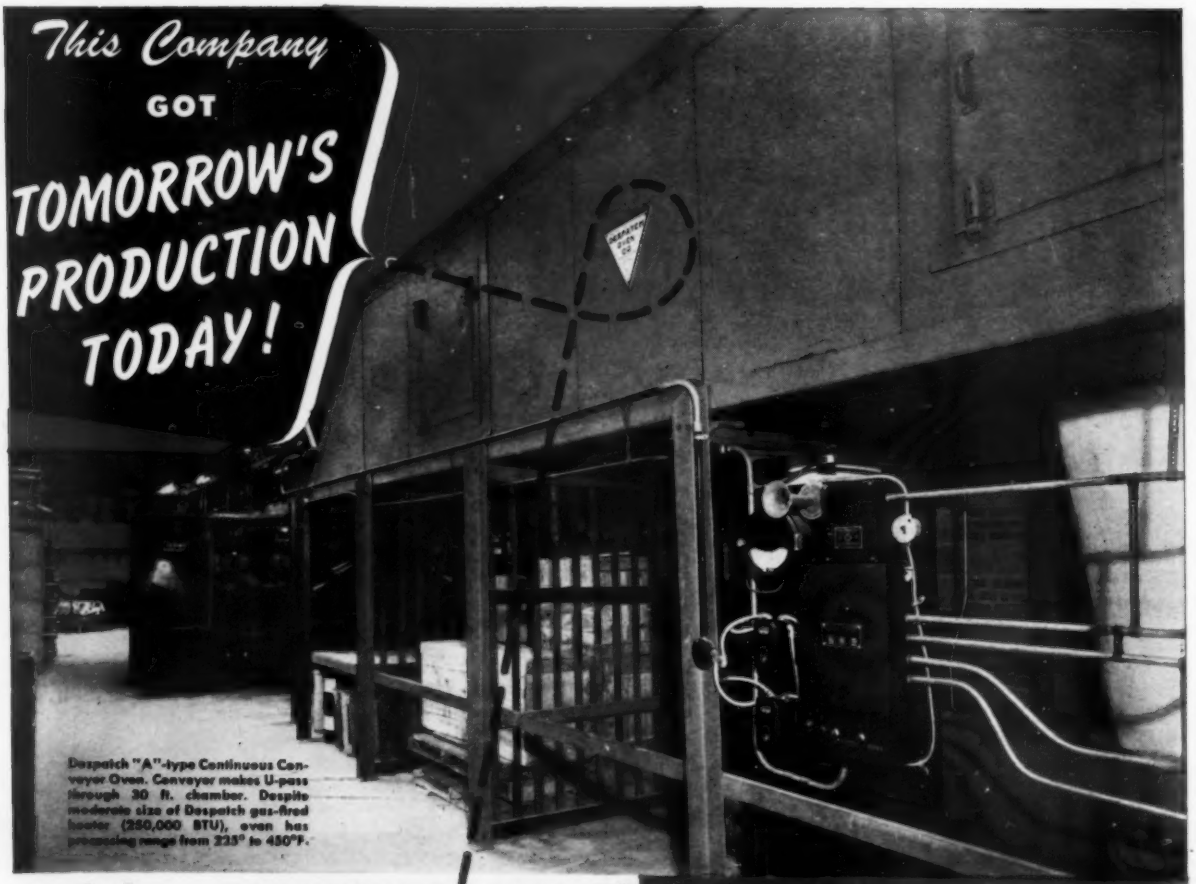
**KAYKOTE DIVISION, KRAUS RESEARCH LABORATORIES, SPARKS, MD.**

West Coast Distributor ... INDUSTRIAL COATINGS COMPANY – 4031 Goodwin – Los Angeles 28, California – Tel. Chapman 5-2883

*This Company*

**GOT**

**TOMORROW'S PRODUCTION TODAY!**



Despatch "A"-type Continuous Conveyor Oven. Conveyor makes U-pass through 30 ft. chamber. Despite moderate size of Despatch gas-fired heater (250,000 BTU), oven has processing range from 225° to 450°F.

## with a DESPATCH Finish Baking Oven

**Could YOU get 62% more output from your finish baking oven *today*?**

Ask production-wise *Quiet Heet Mfg. Corp.* this question and you'll get a prompt "Yes!" . . . because this Newark oil burner manufacturer planned ahead, asked DESPATCH for a finish baking oven "with *extra* baking capacity to meet future production needs."

This foresight proved sound. Because shortly after DESPATCH installed the "A"-type conveyor oven shown above, *Quiet Heet* was swamped with orders, needed extra baking output immediately.

*This Despatch Oven not only proved capable of baking 15-lb. oil burner housings faster than laboratory-approved time-temperature data had specified . . . it also gave 62% more output per day (above normal average) . . . saves 200% in labor with its conveyor system . . . prevents heat loss and fumes in paint shop . . . saves fuel and floor-space (even provides storage space under oven!). No oven alterations were needed; conveyor was simply speeded up and heat increased.

Here's real proof of the plus-performance you can get from DESPATCH's powerful, high volume forced convection heat! It gives you the means to handle tomorrow's production *today* . . . assures faster, better baking in ovens that are right for your particular needs.

***WRITE TODAY** for complete details.

**DESPATCH OVEN CO.,** 109 DESPATCH BUILDING 8th STREET at 7th AVE. S.E. **Minneapolis 14, Minn.**

Fifteen-pound oil burner housings leave spray-booth on conveyor, enter oven (lower left). After rapid U-pass through oven, conveyor carries baked pieces on to unloading area. No manual handling is required during finishing process.

**DESPATCH**
OVEN COMPANY

Complete Finishing Systems or Individual Ovens
BAKING OVENS • DRY OFF OVENS • RUST PROOFERS
AIR CONDITIONERS • SPRAY BOOTHS • CONVEYORS
FLOW COATERS • WASHERS

# THE Finish Line

**"HUMANICS" IN INDUSTRY —** sound treatment of the problem of human relations will take its place as a consideration of number one importance in the successful organizations of the future. A realization of its importance is *starting* to make itself felt; and as its velocity increases, so will a healthier and happier situation for all who form a part of our industrial nation.

The thoughts on this page were inspired by and borrowed from an invigorating address by Ken Wells before the February 15th meeting of the Chicago District Enamelers Club. *(See "Chicago District Enamelers Club"— page 34)* Mr. Wells has a message containing food for thought for the "*individual man*," whether he be the president of a large company, a plant superintendent, a foreman or an enamel plant sprayer — whether he be John Jones, Jim Collins, or James Smith.

### The first half of the century

We review with pride the industrial accomplishments of the first half of the present century, with its broad advances in technical knowledge, mechanical engineering and mass production techniques. No one would question the progress in these fields of human endeavor. But what has happened to "human engineering" — human relationships — that man-to-man contact which was considered a part of every business in the earlier stages of development?

The fact is that as industry has enjoyed its phenomenal development mechanically, it has *lost* the "man-to-man" — the human touch — almost entirely. More often than not we now refer to manager, engineer, machinist, typist or bookkeeper as a component of an industrial machine and not as Bill Smith, Tom Jones or Mary Carmichael. Human relationships in business have slipped, and slipped badly. The "individual" has lost his identity. There are many reasons, the most obvious of which is the "big" organization. Reasons are less important than the remedies.

### The "practical" angle

If you would consider the problem from the dollars and cents angle alone, Mr. Wells will show you where everyone, from the laborer to the stockholder in a business, stands to gain (and in dollars and cents) by an improvement in human relationships.

The challenge is to consider last year's financial statement. Let us say it shows a reasonable net profit — then figure the total man hours of work represented in the profit. It may be entirely possible to show that by the small increase of only two to three per cent added work per person, resulting from a more satisfactory working basis for the "individual," that net income would double.

### The second fifty years

There is opportunity for as great an advance in the human side of industry during the last half of the century as has been made technologically during the first fifty years.

It is the opinion of some that the successful key men of the future will be those who prove their ability in human relations — their ability to work "man-to-man" and to sell the idea to all who work with them. These men will have the ability to again bring teamwork into industry.

Now — let's not get the idea that this is a job for "the other guy," or possibly for presidents, vice presidents or superintendents only. If such a movement is to be successful, it will be because every type of individual in industry, from Bob Smith on the grinding wheel to H. P. Alden in the president's seat, decides it can be done and has it in his heart to do his share. We can't all be a Will Rogers, but we can at least take pointers from the trail he blazed.

If industry can arrive at a point where workers, *as individuals*, are on an increasingly satisfactory working basis, the dividends will be great.

We can't afford to slip back any farther. The only successful way, the only *practical* way, is toward a philosophy of "getting along together" — such a philosophy can be popular and it *must* be popular if industry is to reach its potential.

Dana Chase

EDITOR AND PUBLISHER

# It's the GRIP that counts in GROUND COATS

THERE are many places where "grip," the ability to "stay put," is important, but none of greater importance for the porcelain enameled metal product manufacturer than the "grip" of the ground coat enamel.

Cover coats are important, too. It's the final finish which your customer sees and which must sell your product, and keep it sold. But the finest cover coat enamel ever made, including Century's, may prove to be a complete disappointment in the long run unless it has the firm foundation of a ground coat with "grip".

Ground coat enamels by Century have protected the appearance and durability of many of the country's leading appliances and other metal products for many years. They are time-proved in plant operation, and time-proved in field service on the products.

You take no chance in specifying Century ground coat frits, except a good chance of saving money in enamel plant operating costs. Why not try them now?

**FRIT from CENTURY**

**FRIT MASTERS**

**CENTURY VITREOUS ENAMEL COMPANY, 6641-61 S. Narragansett Ave., Chicago 38, Ill.**

# *there's no place for guesswork in INDUSTRIAL MASONRY*

A skilled HUYCK mason is pictured inside a new 6'x10' mill installing a lining of porcelain brick.

★ ★ ★ Building a furnace or lining a mill or any other industrial masonry job you can name requires the skill of experienced masons. There just can't be any haphazard guesswork.

★ ★ ★ For 21 years HUYCK Construction Company has been called upon to design and build new furnaces, and rebuild old ones . . . to line new mills or re-line old ones.

★ ★ ★ In fact, whenever any industrial masonry looms ahead — new or maintenance — people just naturally turn to HUYCK. It will pay you to do likewise.

## *CALL*

# HUYCK

## HUYCK CONSTRUCTION COMPANY

2946 North 78th Ct. • Phone: Elmwood Park 1339-M

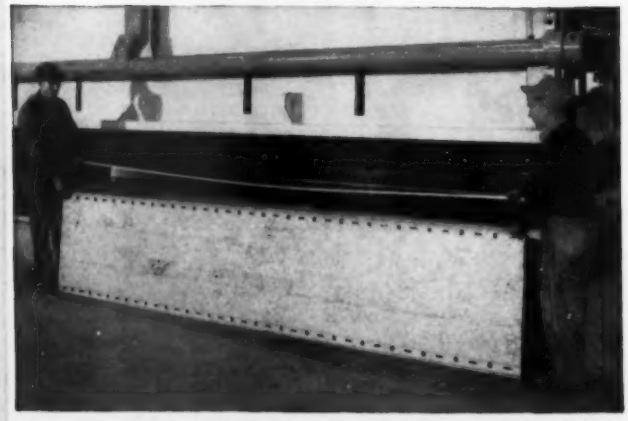
ELMWOOD PARK, ILLINOIS

# A Big Brute

- 700-ton capacity
- 24" depth of throat
- Quadruple drive
- Slide and bed area of 48" (F to B) x 288" (R to L)
- Weight over 400,000 lbs.

## This Verson PRESS is helping put roofs over homeless heads!

Another of the many unusual jobs being handled on Verson Presses.



Whether it's tough combination multiple punching and forming such as is handled by the press shown above, or a job requiring press equipment that has never before been built, more and more manufacturers are taking advantage of Verson's engineering skill and press building ability. Pioneers in the field of modern press development, Verson *originated* Allsteel Welded Construction over 25 years ago and has steadily added to its list of achievements.

What's your problem? Let us talk it over with you.

**VERSON ALLSTEEL PRESS CO.**
9320 S. Kenwood Ave. Chicago 19, Illinois
*Originators and pioneer builders of Allsteel Welded Presses*

POWER PRESSES - CLUTCHES - FORGING PRESSES - DIE CUSHIONS - HYDRAULIC PRESSES - PRESS BRAKES

# The straight line production of glass lined water heaters

## detailed description of ceramic finishing equipment and operations

illustrated with exclusive finishfotos

*By W. W. Higgins* • MANAGER OF QUALITY CONTROL, A. O. SMITH CORPORATION, KANKAKEE WORKS, KANKAKEE, ILLINOIS

Exclusive feature finish

As a result of close association with the automobile industry, our company long since has proved advantages and economy of so called "straight line" production. In laying out our new plant at Kankakee, advantage was taken of every possibility for making it such an operation, and no opportunity was lost for including the latest thinking in plant design and lay-out, heat and lighting, and general conveniences.

### Two complete ceramic finishing units

At the present time, two complete and independent ceramic finishing units comprise the department for cleaning and glass coating tank parts. A third such unit will be installed within the next few months. Each unit includes the following sections: (a) sand blasting, (b) application room (c) drier, (d) brushing equipment, (e) furnace, and (f) inspection line.

### Automatic sand blast units for cleaning

The sand blast units are automatic in operation and include three sections: (1) for loading and unloading, (2) for blasting, and (3) for blowoff. The parts are loaded on revolving pedestals (one for each part, whether head, flue, or shell). The complete unit then revolves so that the loaded parts enter the blasting section. Here, lances lower inside the tank shell requiring inside cleaning, and the outside of the flue and each of the two heads, blasting each part as it revolves on its individual turn-table. The blasting unit as described is enclosed in a room approximately twenty by thirty feet, so it is isolated from the rest of the ceramic finishing unit.

### Applying the glass lined finish

A monorail conveyor carries the cleaned tank parts through the application room. The tank shells and flues are coated by slushing, while the glass coating is applied to the tank heads by hand spraying on a rotating turn-table. The glass coating slip in the slushing operation drains from the shells and flues into a tank, where practically 100% is reclaimed. In this operation, the slip is pumped from the drain tank through a centrifugal sieve and magnetic separator into twenty-five gallon porcelain enameled cans. These are then moved on small dollies to a nearby stationary motor driven agitator. The necessary distilled water is added (water content is held constant), and the slip is set with nitrite to a definite "pick up" value. "Pick up" tests are run on a one square foot porcelain enameled plate to assure uniformity of results. Although the glass coating finish used is a dark blue color, screening and magnetic separation is employed as a safety factor against the possible inclusion of contaminating materials.

### Preparing the glass coating finish

The mill room represents a relatively simple installation as there is only one type finish used — this is an especially developed blue glass with exceedingly high resistance to the wide variety of very corrosive factors encountered in water heater operations.

The frit used is manufactured at our Milwaukee plant and shipped in 100 lb. multiwall paper bags. As the frit is unloaded at Kankakee, it is placed on pallets holding 25 bags of frit (one mill charge). The pallet is lifted by a monorail hoist to a loading balcony over the two 5′ x 6′ porcelain lined ball mills. The required synthetically distilled water is produced by a two stage water de-ionizing unit of 150 g.p.h. capacity, and is fed to the mill through a 500 gallon storage tank and water meter. The whole unit operates under regular city water pressures.

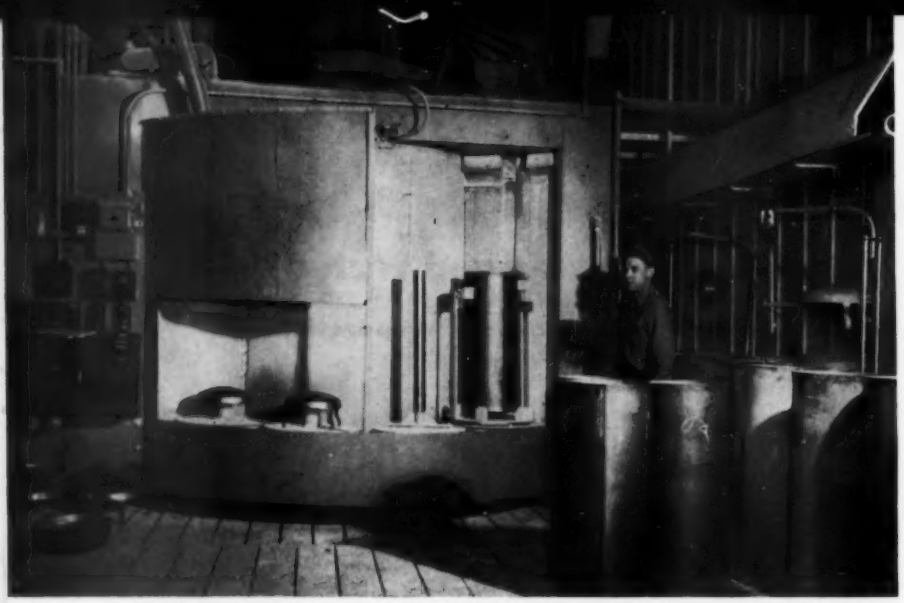
Mills are unloaded with 5 lbs. air pressure and the slip then passes by gravity through centrifugal sieve, magnetic separator, and into porcelain enameled transfer cans. These cans are transported on dollies to the application rooms.

The mill room has an adequate frit and clay storage area, and its own control laboratory for the control of the slip. The control room contains all the necessary equipment for close control work, such as screens, torsion balance, rotap, specific gravity container, "pick-up" plate, and infra-red bulb and reflector on an adjustable arm for use in drying screen samples.

### Drying and brushing

After the tank parts are coated, the conveyor carries them through a gas fired convection type drier. It may be of interest to enamelers to know that this drier is direct fired and, therefore, allows the products of combustion to come in direct contact with the ware.

As the parts leave the drier, they pass a water wash spray booth where the shell exterior gets a "dust coat" of glass coating to prevent excessive scaling during the subsequent firing



*This view of a sandblasting unit shows the method of holding parts to be cleaned.*

*Slushing glass coating slip on shell interior. Note special conveyor tools used.*

*Glass lined shell interiors and flue exteriors are being electric resistance tested.*

operation. At this point, also, the top and bottom edges of the interior of the shell are hand brushed and a suction system takes away the dust at brushing level.

Our engineers designed ingenious equipment for combined coating and brushing operations on the smaller parts. For instance, the flue, which is only 3″ to 4″ I.D., is revolved on a special unit in a booth adjoining the conveyor line. The operator moves rotary brushes into contact with the flue exterior to brush areas at the top and bottom while an automatic gun on a lance coats the inside. In an adjoining booth, another semi-automatic unit brushes the edges of the head skirt and flue hole to provide for the welding at final glass-lined tank assembly.

**Two compartment furnaces**

The new furnaces in our Kankakee plant are a refinement of the controlled atmosphere, roller hearth type, furnace equipment used in Milwaukee. *(Described by W. G. Martin in the Bulletin of the American Ceramic Society, Vol. 20, No. 12, December 1941.)* Each furnace has two compartments in tandem separated by approximately two feet of open space. Each compartment is an individual gas fired radiant tube furnace, with doors at both ends. The first compartment is the oxidizing zone which carries a temperature of about 1050° F., while the second compartment is the glass fusing zone in which the atmosphere is purged of all oxygen and the ware fired in a controlled atmosphere at 1600°F.

A third section, parallel and adjacent to the oxidizing and fusing compartments, forms a part of the furnace unit for force cooling the ware to room temperature. The complete cycle, consisting of oxidizing, fusing, and cooling, is integrated and operated automatically. The ware proceeds on alloy grids or tray sections progressively from loading position to oxidizing, to fusing, to cooling, to unloading, and back to the loading position again via roller topped transfer cars and the roller hearths of the furnace compartments and cooling zone.

A central plant for the production

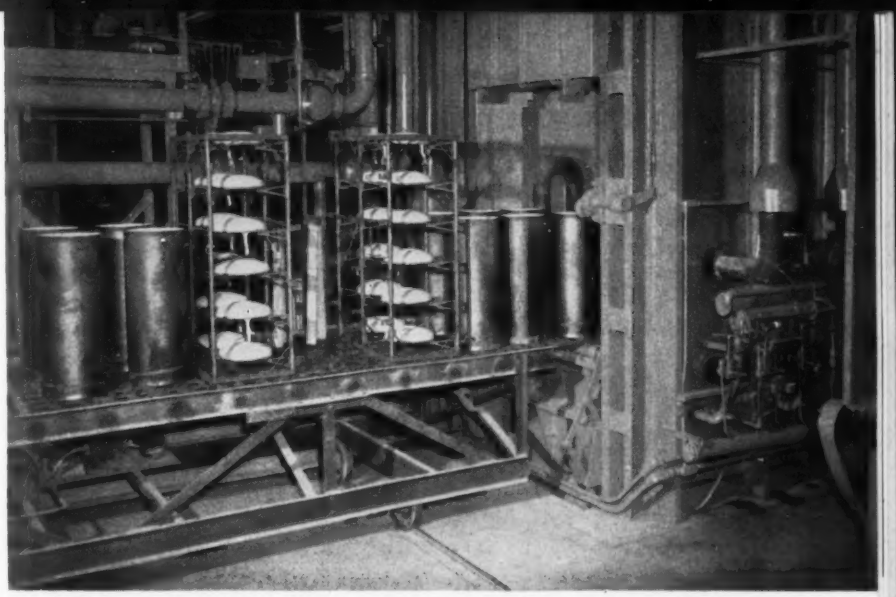
of "controlled atmosphere" serves both furnace units. A combination engine and compressor, operating off a common crank shaft, produces the atmosphere needed. In this unit the products of combustion from the engine portion, after passing through water spray cooling towers, are compressed in the compressor portion of the unit to 100 - 125 lb. pressure. This compression and subsequent cooling gives a controlled atmosphere with little moisture content. (A dew point of approximately 15°F.) The prepared atmosphere is forced by its compression pressure through automatic flow regulating valves into the fusing compartment of the furnace after each new load has entered and the compartment doors are sealed tightly. Thus, the firing zone is purged of all oxygen which is forced out through vents in the sidewall.

The alloy rolls of both furnace hearths have water cooled shaft ends and water cooled bearings. The furnace compartment where the glass is fused has large water cooled castings completely around its two door openings to assure a flat unwarped surface for the doors to seal against. In addition, this compartment has a completely welded steel outer shell to assure a minimum amount of atmosphere leakage.

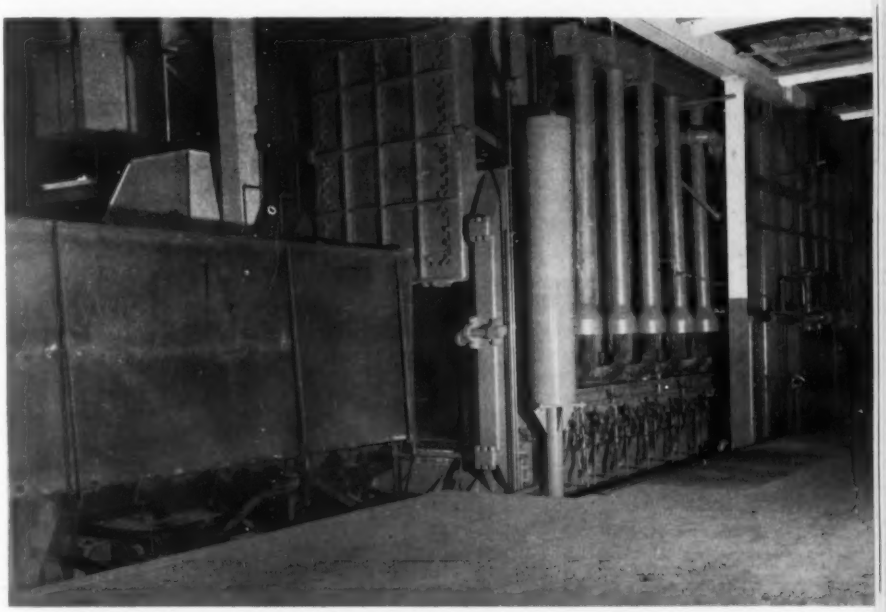
**Special burning tools**

The burning tools may be of interest because of their design and composition. A comparatively heavy, honeycomb, sectional, tray type rack carries the complete load on the furnace roller hearth conveyor. These trays are cast alloy of 35% nickel and 15% chrome content. Special tools for "racking" the tank heads and holding the flues in place vertically are made up of a combination of drawn tubing, rods, strips, and castings. These are welded into a structural unit or rack, which is comparatively light in weight for its size, yet holding twice its weight in ware. The composition in this instance is 80% nickel and 15% chrome.

For operations such as the cooling unit, where cool air is brought in from outside the plant, it is in each instance returned to the outside atmosphere so that it does not affect

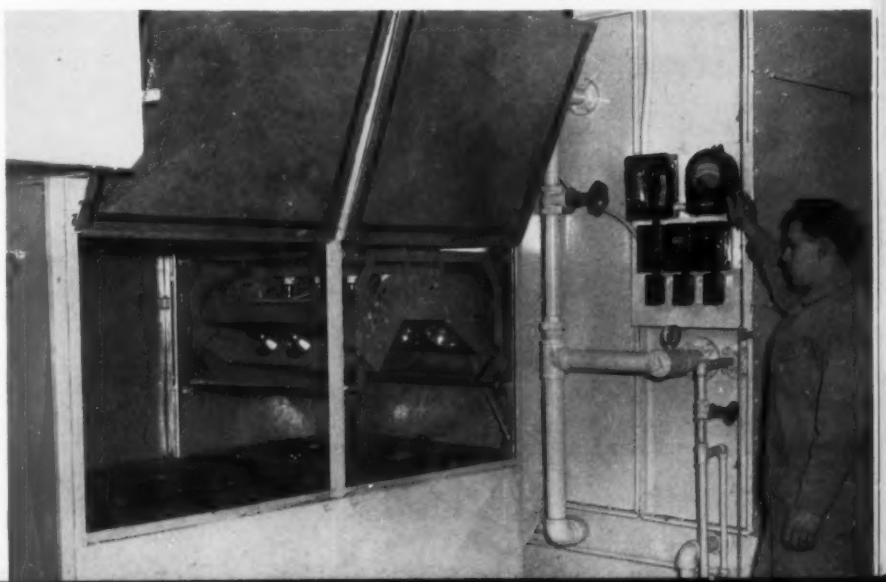


*A load of tank components, in sets, entering the furnace oxidizing compartment.*



*Exit end of furnace controlled atmosphere compartment — transfer car in foreground.*

*Combination cooling unit and adjustable infra-red drying unit in ceramic laboratory.*



*Special Smith-designed equipment. Above: For brushing water heater heads at weld points. Below: For brushing exterior areas of flues while automatically spraying interiors.*

the "balance" of the plant radiant heating system during winter months and cannot add heat to the plant during the summer. Ware coming from the furnace at 1600°F. is at room temperature after travelling through this forced air cooling unit of only 30′ length.

We have all heard of the butcher who "uses everything but the squeal." In line with this, it might be interesting to note that the heated water resulting from water cooling furnace roller hearth bearing and castings around the furnace doors will ultimately be piped to hot rinse tanks in the galvanizing department and used there with resultant fuel saving.

### Complicated control system

As can be imagined, the system for operating the furnace unit comprises a complicated battery of switches, controls and recorders. At the foreman's table for each furnace unit are four sets of recorders which show at all times the following information: (1) temperature in oxidizing compartment of furnace, (2) temperature in glass fusing compartment, (3) flow of atmosphere into glass fusing compartment, and (4) composition of atmosphere in glass fusing compartment.

The furnace itself is completely automatic once the timers have been set for the length of cycle desired in each of the oxidizing and fusing compartments.

### Electrical resistance testing used

The inspection conveyor for all glass lined tank components coming from the furnace adjoins the cooling zone of each furnace unit. In first coat, the tank interiors get a close visual inspection with a portable lamp and any visible defects ground out with a small air driven hand grinder. When finished in second coat, electrical resistance testing for continuity of coating is employed.

At present, a wet pad is passed over all surfaces of the tank, and any minute imperfection in the coating registers directly on a Junior Volt-ohmist mounted at the inspection conveyor. Later, this testing will be done automatically with an especially

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# The properties of porcelain enamel
## and their effect upon enamelware

*By H. D. Carter, B. W. King and H. C. Draker*

THE HARSHAW CHEMICAL COMPANY, CLEVELAND, OHIO

**Part I**

### SECTION I. PRELIMINARY CONSIDERATIONS

#### 1. Introduction

Prior to this investigation considerable information had been obtained concerning kitchenware frits. With the development of standard tests by the Enameled Utensils Manufacturers Council, a means was available to evaluate these frits in regard to their suitability for use in the production of this type of ware.

During the progress of this preliminary work it was noted that, in general, certain enamel characteristics had very definite effects upon the resulting properties of enamelware as measured by these tests. Similar correlations have been recorded in the literature and have been ably covered and reported in articles by Prof. F. A. Petersen of the Council. There is, however, a lack of information regarding data which correlates the factors which may influence such properties when measured specifically by the E. U. M. C. standard tests.

Evidence from the results already at hand indicated that any systematic attempt to plan an investigation to cover all of the points involved would, by nature, become rather extended and might lead to more or less inconclusive results in some phases. This possibility is further enhanced by the following facts: (1) the results would by necessity be obtained on a limited number of samples, (2) certain phases might require more extensive and thorough research than would be possible with the present problem, (3) a normal variation will occur in the samples which may affect the consistency of the results, (4) when attempting to vary conditions to study their effect, a new variable might be introduced as, for instance, the bonding property and adherence of ground coats with changes in firing conditions, (5) the exactness of the method of testing which, judging from the amount of research which has been done, has reached the ultimate for this type of work, and (6) known differences between calculated and measured values for expansion factors.

Although these difficulties were apparent, it was felt that a general investigation would fill a definite need in that it would add to the overall information for the industry and would serve to determine points that should be given either additional or more thorough consideration. It was also felt that it would be advantageous to attempt to use, at all times, a practical approach to the problem.

#### 2. General Procedure

As the initial step, 500-pound batches of four cover coat frits were made with variations in composition as shown in Table I. Later one hundred and twenty-five pound batches were made of frit C-O. The changes from frit to frit were made in such a manner as to give a range of properies which are also shown in this table.

During the progress of the work it was necessary to make several repeat millings of all frits, both ground and cover coats. In every case, these additional millings were made as close as practical to the standard given for the original milling.

For the first series of samples, pans were prepared by dipping a commer-

FIGURE I
**Flow Test Cover Coats**

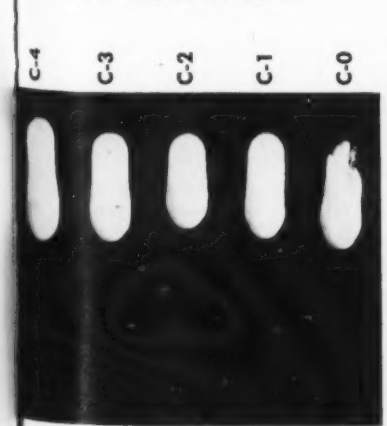



FIGURE II
**Flow Test Ground Coats**

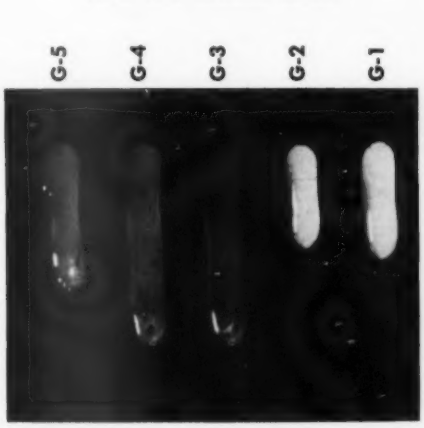



FIGURE III
**Flow Test Ground Coat Blends**

**TABLE 1.**

**COVER COATS**

| | C-0 | | C-1 | | C-2 | | C-3 | | C-4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Feldspar | 6 | 15.6 | 12 | 31.2 | 12 | 31.2 | 17 | 44.2 | 17 | 44.2 |
| Quartz | 47 | 37.6 | 39 | 31.2 | 39 | 31.2 | 34 | 27.2 | 34 | 27.2 |
| Pyrobor | 21 | 66.2 | 21 | 66.2 | 15 | 47.3 | 15 | 47.3 | 15 | 47.3 |
| Soda Ash | — | — | 2 | 11.7 | 8 | 46.8 | 8 | 46.8 | 8 | 46.8 |
| Sodium Nitrate | 3 | 11.0 | 3 | 11.0 | 3 | 11.0 | 3 | 11.0 | 3 | 11.0 |
| Fluorspar | 2 | 5.0 | 2 | 5.0 | 2 | 5.0 | 2 | 5.0 | 2 | 5.0 |
| Cryolite | — | — | — | — | — | — | 4 | 29.6 | 12 | 88.8 |
| Sod. Sil. Fluoride | 12 | 60.0 | 12 | 60.0 | 12 | 60.0 | 8 | 40.0 | — | — |
| Antimony Oxide | 7 | 25.2 | 7 | 25.2 | 7 | 25.2 | 7 | 25.2 | 7 | 25.2 |
| Calcite | 2 | 5.6 | 2 | 5.6 | 2 | 5.6 | 2 | 5.6 | 2 | 5.6 |
| Total | 100 | 226.2 | 100 | 247.1 | 100 | 263.3 | 100 | 281.9 | 100 | 301.1 |
| Calc. Expansion | | 232 | | 256 | | 280 | | 300 | | 321 |

**MILLED ENAMEL (AS DIPPED)**

| | C-0 | C-1 | C-2 | C-3 | C-4 |
|---|---|---|---|---|---|
| Specific Gravity | 1.72 | 1.75 | 1.75 | 1.75 | 1.75 |
| Grs. Pick-up 4 x 6" | 16.5 | 16.0 | 17.0 | 17.1 | 15.5 |
| Grs/200 M/50 cc. | 4.0 | 4.3 | 5.0 | 4.3 | 4.5 |
| Fusion Flow MM. | 38 | 38 | 34 | 39 | 45 |
| Spot Test | Stain | Stain | Stain | Sl Etch | Etch |
| Grs/Sq. In. E.U.M.C. | .0030 | .0023 | .0022 | .0034 | .0056 |
| %R at 40 grs/Sq. Ft. | 53.2 | 61.8 | 58.9 | 61.8 | 62.6 |

**Mills: (Table I)**

Frit ..... 25 lbs.
Clay 7-97 Lump ..... 1¾ lbs.
Uverite, 20-H ..... 1¼ lbs.
Water ..... 10½ lbs.
Set with $K_2CO_3$ or $BaCl_2$ as required.

**Mills: (Table II)**

Frit ..... 25 lbs.
Clay 7-97 Lump ..... 1¾ lbs.
Borax ..... 1⅛ lbs.
Sodium Nitrite ..... ½ lbs.
Water ..... 12½ lbs
Set with Epsom Salts as required.

**TABLE II.**

**GROUND COATS**

| | G-1 | | G-2 | | G-3 | | G-4 | | G-5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Feldspar | 36 | 93.6 | 41 | 106.6 | 35 | 91.0 | 38 | 98.8 | 41 | 106.6 |
| Quartz | 21 | 16.8 | 20 | 16.0 | 12 | 9.6 | 12 | 9.6 | 12 | 9.6 |
| Pyrobor | 22 | 69.3 | 22 | 69.3 | 25 | 78.8 | 25 | 78.8 | 25 | 78.8 |
| Sodium Nitrate | 5 | 18.3 | 4 | 14.6 | 7 | 25.6 | 7 | 25.6 | 7 | 25.6 |
| Fluorspar | 9 | 22.5 | 3 | 7.5 | 9 | 22.5 | 6 | 15.0 | 3 | 7.5 |
| Soda Ash | 5 | 29.3 | 8 | 52.7 | 10 | 58.5 | 10 | 58.5 | 10 | 58.5 |
| Cobalt Oxide | 0.5 | 2.1 | 0.5 | 2.1 | 0.5 | 2.1 | 0.5 | 2.1 | 0.5 | 2.1 |
| Nickel Oxide | 0.5 | 2.0 | 0.5 | 2.0 | 0.5 | 2.0 | 0.5 | 2.0 | 0.5 | 2.0 |
| Manganese Oxide | 1.0 | 2.2 | 1.0 | 2.2 | 1.0 | 2.2 | 1.0 | 2.2 | 1.0 | 2.2 |
| Total | 100.0 | 256.1 | 100.0 | 273.0 | 100.0 | 292.3 | 100.0 | 292.6 | 100.0 | 292.9 |
| Calc. Expansion | | 270 | | 290 | | 320 | | 320 | | 321 |

**MILLED ENAMEL**

| | G-1 | G-2 | G-3 | G-4 | G-5 |
|---|---|---|---|---|---|
| Specific Gravity | 1.59 | 1.60 | 1.59 | 1.60 | 1.60 |
| Grs. Pick-up 4 x 6" | 14.0 | 14.3 | 13.7 | 13.9 | 15.5 |
| Grs/200 M/50 cc. | 5.1 | 5.5 | 7.0 | 5.5 | 5.0 |
| Fusion Flow MM. | 45 | 40 | 78 | 78 | 57 |
| Temperature | 1540 | 1560 | 1500 | 1530 | 1560 |
| Time | 3 | 3 | 3 | 3 | 3 |

cial ground coat blend which had given good results previously. These ground-coated pans were then coated with various combinations of the cover coats. In these, as in all of the subsequent trials, pans were fired individually in an electric laboratory furnace with the thermocouple protruding inward from the back wall. The door of this furnace contains heating elements and since the pans were placed in the center of the furnace, all firings were considered to be uniform and very close to recorded conditions.

Later, a series of ground coat frits were made in four hundred pound batches. Variations were made in composition in order to determine the effect of ground coat properties upon the final results. These compositions are given in Table II. It should be noted that an effort was made to vary the composition in such a manner that different properties of the various frits would not be in the same order. For example, frit G2 is more refractory than either G1 or G3, but is intermediate in regard to expansion. In comparing G3, 4 and 5 it will be found that the expansion has been kept constant and the hardness has increased from G3 to G5. These properties were checked by running a firing range for each frit. The results are given in Table III.

The fusibility of the various enamels can also be compared by making fusion tests as illustrated in Figures I, II and III. This test is made as follows: (1) two and one-half grams of dry-milled enamel are compressed in a hydraulic hand press to 2,000 pounds per square inch, this gives a pellet having one-half inch diameter and an approximate height of three-eighths of an inch, (2) the pellets are placed on the horizontal portion of an enameled steel plaque which has been bent to form a right angle, (3) the plaque with the pellets in this position is placed in a furnace at 1520°F., (4) after two and one-half minutes, the plaque is tilted by means of a rod so that the side containing the softened pellets is placed in the vertical position, (5) the test is then continued for seven and one-half minutes. During this

time the softened pellets will flow down the vertical side of the plaque. In making this test it should be realized that frits will flow differently at various temperatures, and it may be advisable to make a series in which the flows can be compared for different temperatures. In this case, however, the test has been made at a single temperature but, with the data given in Tables III and IV, a complete picture is obtained of the fusibilities of the ground coats which have been used.

From time to time, as when firing conditions were being studied, a blend of the different ground coat frits was used. Variations in bonding properties and adherence were kept at a minimum in this manner. The firing range for most of the blends used is given in Table IV. From a practical viewpoint, the advantage of a ground coat blend over an individual ground coat is apparent and the possibility of lowering firing temperature or increasing the firing range from 40 to 50 degrees should not be overlooked. Also, in the case of using three frit blends on Steel A, there was much less tendency to blister than when the single ground coat was used.

Samples of standard two-quart pudding pans used for all tests were obtained in different steels from three companies. In all cases the metal shapes were checked or crowned slightly to conform with specifications as set forth in the standards. It was observed that the pans from one source, C, had a definite "oil-can" effect and had the tendency to form "spinners" when fired even though the bottoms had been crowned. It should be emphasized that unless the bottoms of the ware maintain an upward curvature, results from the thermal shock tests will be low and erratic.

All pans and plaques used in the tests were given the following pickling treatment:

| | |
|---|---|
| Cleaner | Boiling — 15 minutes |
| Rinse | 170° - 180° F. |
| 6 - 7 % $H_2SO_4$ | 150° - 160° F. 10 minutes |
| Rinse | 170° - 180° F. |
| Neutralizer | 150° - 160° F. 5 - 7 minutes |

*Pages 22 & 23 for Fig. IV, V, VI & VII*
*SECTION II starts on Page 24*

**TABLE III.**

**FIRING RANGE — INDIVIDUAL GROUND COATS**

| Firing | | G-1 | G-2 | G-3 | G-4 | G-5 |
|---|---|---|---|---|---|---|
| 1440-3 | Surface<br>Adherence | | | O. K.<br>Fair | | |
| 1470-3 | Surface<br>Adherence | | | | | |
| 1480-3 | Surface<br>Adherence | Fish Scale<br>Poor | | | O. K.<br>O. K. | |
| 1500-3 | Surface<br>Adherence | | O. K.<br>Poor | O. K.<br>O. K. | | Sl. Rough<br>O. K. |
| 1530-3 | Surface<br>Adherence | | | | | |
| 1540-3 | Surface<br>Adherence | O. K.<br>Good | | | Sl. Rough<br>O. K. | |
| 1560-3 | Surface<br>Adherence | | O. K.<br>Fair | Sl. Overfire<br>Good | | Sl. Rough<br>O. K. |
| 1590-3 | Surface<br>Adherence | | | | | |
| 1600-3 | Surface<br>Adherence | O. K.<br>Good | | | Rough<br>Fair | |
| 1620-3 | Surface<br>Adherence | | Sl. Overfire<br>Good | | | Rough<br>Fair |

Poor → Fair → O. K. → Good

Application 20 Grams per Square Foot. Tests made on 6″ x 12″ — 22 Gauge Plaques.

**TABLE IV.**

**FIRING RANGE — GROUND COAT BLENDS**

| Firing | | G2-3<br>G2-50<br>G3-50 | G3-4-5<br>G3-33<br>G4-33<br>G5-33 | Blend A<br>G1-20<br>G2-40<br>G3-40 | Blend B<br>G1-40<br>G2-20<br>G3-40 | Blend C<br>G1-40<br>G2-40<br>G3-20 |
|---|---|---|---|---|---|---|
| 1470-3 | Surface<br>Adherence | Good<br>O. K. | O. K.<br>O. K. | | | |
| 1480-3 | Surface<br>Adherence | | | O. K.<br>Fair | O. K.<br>Poor | O. K.<br>Poor |
| 1510-3 | Surface<br>Adherence | | | Good<br>Fair + | O. K.<br>Fair + | O. K.<br>Poor |
| 1530-3 | Surface<br>Adherence | O. K.<br>Good | Fair<br>Fair | | | |
| 1540-3 | Surface<br>Adherence | | | Good<br>Good | O. K.<br>O. K. | Good<br>O. K. |
| 1570-3 | Surface<br>Adherence | | | Good<br>Good | Fair<br>O. K. | Good<br>O. K. |
| 1590-3 | Surface<br>Adherence | Fair<br>Good | Fair —<br>Fair | | | |
| 1600-3 | Surface<br>Adherence | | | O. K.<br>Good | Fair<br>O. K. | Good<br>O. K. |
| 1630-3 | Surface<br>Adherence | | | Sl. Overfire<br>Good | Fair<br>O. K. | Fair<br>O. K. |

Poor → Fair → O. K. → Good

Application 20 Grams per Square Foot. Tests made on 6″ x 12″ — 22 Gauge Plaques.

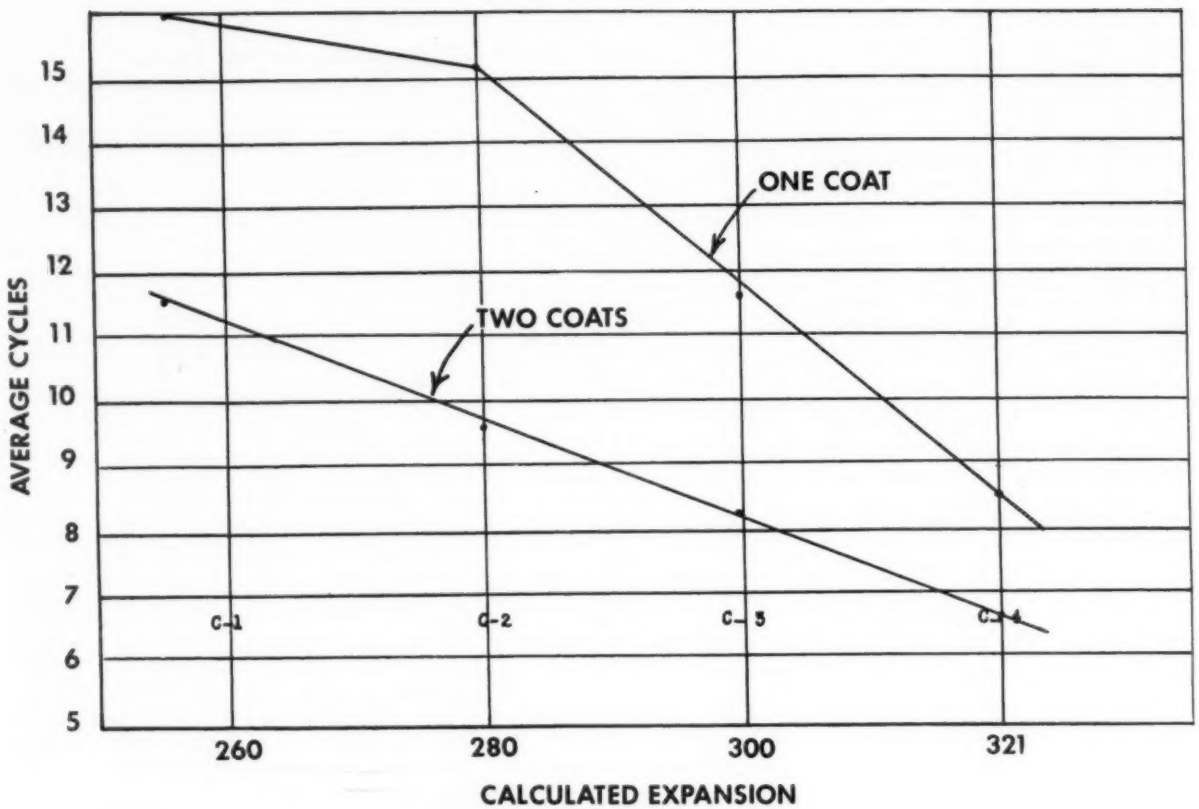



FIGURE IV

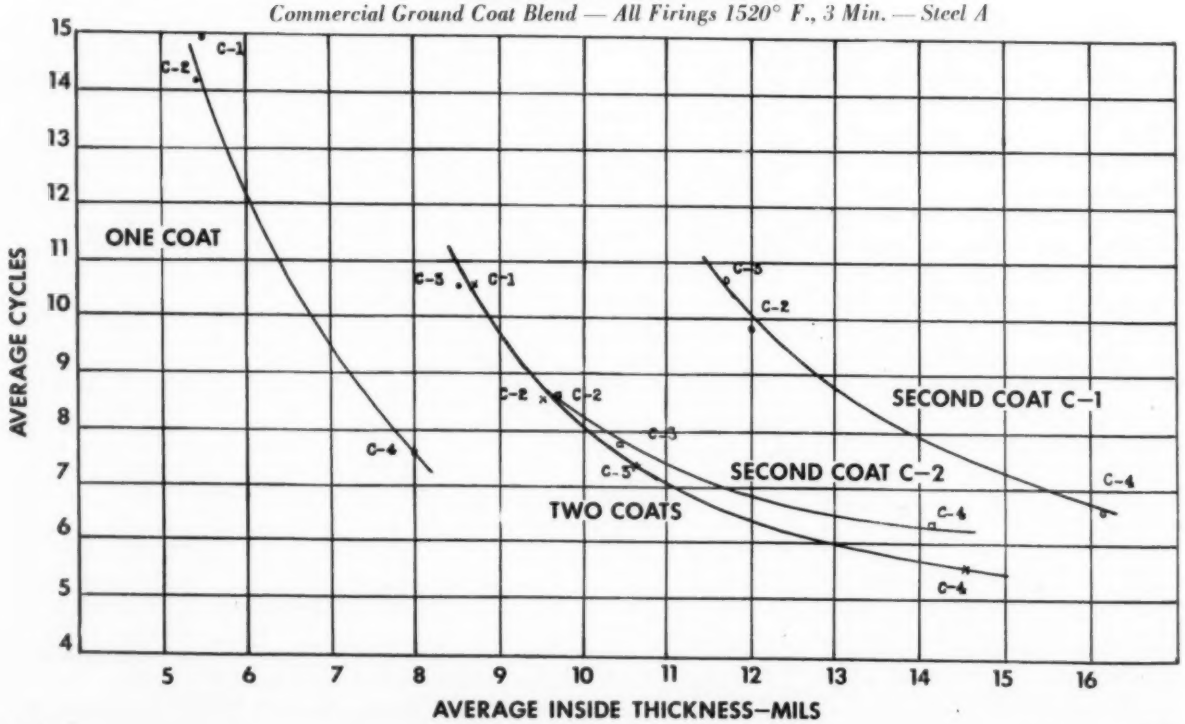
**Thermal Shock vs Calculated Expansion**

*Commercial Ground Coat Blend — All Firings 1520° F., 3 Min. — Steel A*

FIGURE V

**Thermal Shock vs Enamel Thickness**

*Commercial Ground Coat Blend — All Firings 1520° F., 3 Min. — Steel A*



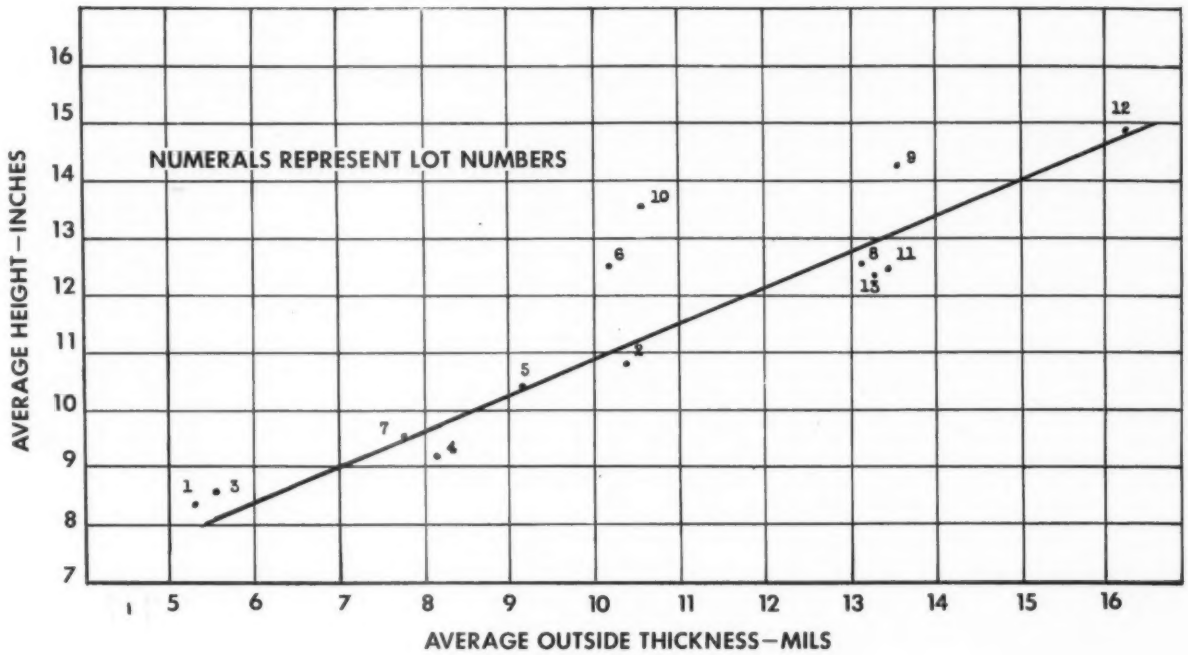



FIGURE VI

**Impact Resistance vs Enamel Thickness**

*Commercial Ground Coat Blend — All Firings 1520° F., 3 Min. — Steel A*

FIGURE VII

**Thermal Shock vs Ground Coat Expansion**

*Cover Coat: First Coat C-3 — Second Coat C-1; Variable Firing; Steel A*

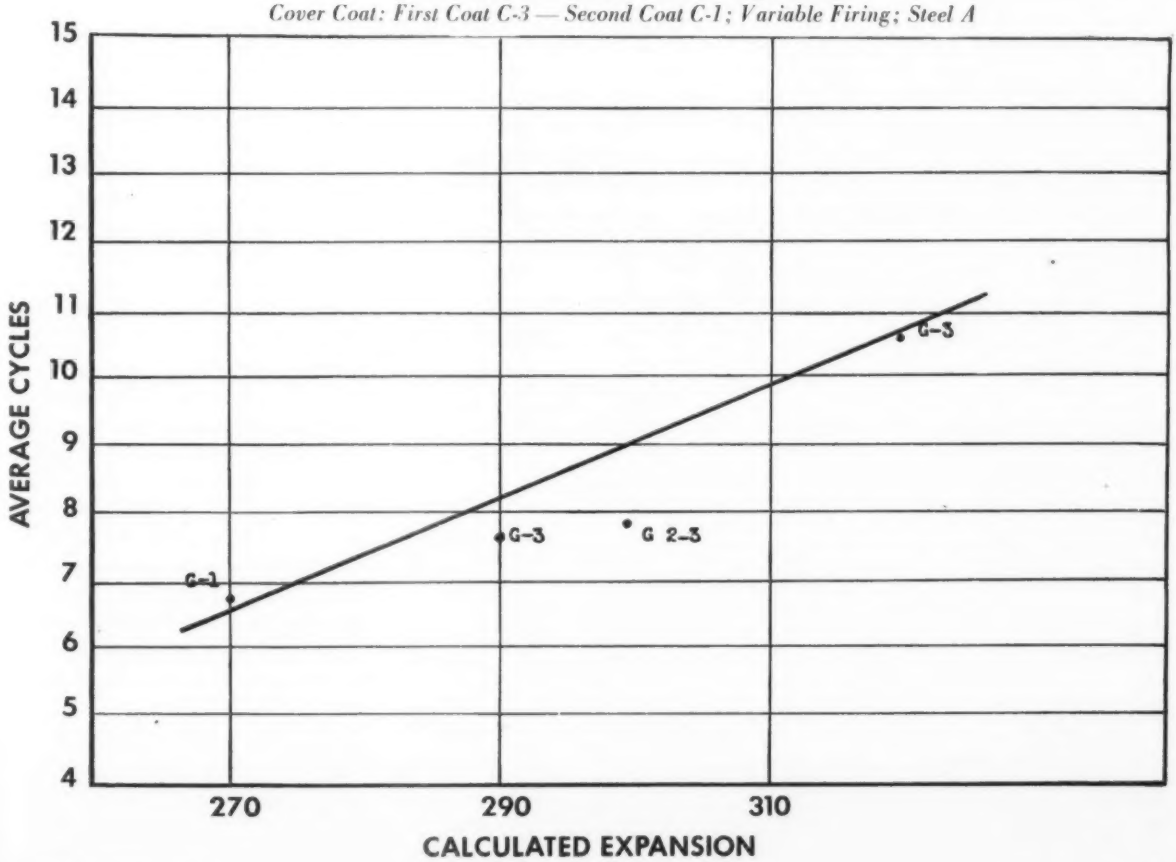


**TABLE V.**

**THERMAL SHOCK — IMPACT**

**COVER COAT VARIABLE: GROUND COAT, FIRING CONSTANT**

| Lot | Ground Coat | 1st Coat | 2nd Coat | Inside Thickness | Thermal Shock | Outside Thickness | Impact |
|---|---|---|---|---|---|---|---|
| 1 | Com. | C-1 | — | 5.5 | 15 | 5.3 | 8.2 |
| 2 | " | C-1 | C-1 | 8.7 | 10.6 | 10.4 | 10.8 |
| 3 | " | C-2 | — | 5.4 | 14.2 | 5.6 | 8.5 |
| 4 | " | C-2 | C-2 | 9.5 | 8.6 | 8.1 | 9.1 |
| 5 | " | C-3 | — | 8.6 | 10.6 | 9.2 | 10.3 |
| 6 | " | C-3 | C-3 | 10.6 | 7.2 | 10.2 | 12.4 |
| 7 | " | C-4 | — | 8.0 | 7.6 | 7.8 | 9.5 |
| 8 | " | C-4 | C-4 | 14.6 | 5.6 | 13.1 | 12.5 |
| 9 | " | C-3 | C-1 | 11.7 | 10.6 | 13.6 | 14.2 |
| 10 | " | C-3 | C-2 | 10.4 | 7.8 | 10.6 | 13.5 |
| 11 | " | C-4 | C-1 | 16.2 | 6.4 | 13.4 | 12.4 |
| 12 | " | C-4 | C-2 | 14.1 | 6.2 | 16.3 | 14.9 |
| 13 | " | C-2 | C-1 | 12.0 | 9.8 | 13.2 | 12.3 |

Thermal Shock: Average 5 Pans  Steel: A
Impact: Average 10 Spots One Pan  All Firings: 1520°F., 3 Minutes

## SECTION II. EFFECT OF EXPANSION AND THICKNESS

### 1. Cover coat expansion

A series of pans, lots 1 - 13, were prepared using the commercial ground coat blend. They were then coated with one and two coats of each cover coat, as well as different combinations of the cover coats. The results are given in Table V and shown in Figures IV, V, and VI. In this series, ground coat composition has been kept constant and since all firings were made at 1520°F. for three minutes, the only variables are cover coat composition and thickness.

An effort was made to keep thickness as uniform as possible but variations did occur, depending to quite an extent upon the ease with which the enamels tended to smooth out during the dipping process. This property is quite characteristic and may vary considerably with different enamels. The thickness was taken on all pans from the average measurement made by a G. E. guage on the inside bottom for thermal shock and the outside bottom for impact. The outside measurement does not represent the true value for the point at which the impacts were made, but it was thought that it would be a reliable index as to the thickness on the radius and would be more useful for practical considerations.

**TABLE VI.**

**THERMAL SHOCK — IMPACT**

**GROUND COAT, FIRING VARIABLE: COVER COAT CONSTANT**

| Lot | Ground Coat | Firing | 1st Cover | 2nd Cover | Inside Thickness | Thermal Shock | Outside Thickness | Impact |
|---|---|---|---|---|---|---|---|---|
| 14 | G-1 | 1540-3 | C-3 | C-1 | 12.9 | 6.8 | 14.9 | 14.2 |
| 15 | G-2 | 1560-3 | " | " | 11.7 | 7.6 | 13.8 | 12.2 |
| 16 | G-3 | 1500-3 | " | " | 11.5 | 10.6 | 13.9 | 11.5 |
| 17 | G2-3 | 1520-3 | " | " | 13.5 | 7.8 | 14.8 | 12.8 |
| 18 | G-3 | 1500-3 | " | " | 11.5 | 10.6 | 13.5 | 11.8 |
| 19 | G-4 | 1530-3 | " | " | 11.3 | 12.2 | 12.9 | 11.5 |
| 20 | G-5 | 1560-3 | " | " | 11.8 | 8.2 | 15.9 | 11.9 |
| 21 | G3-4-5 | 1530-3 | " | " | 11.4 | 7.8 | 14.5 | 12.6 |
| 22 | G3-4-5 | 1500-3 | " | " | 10.8 | 8.6 | 14.6 | 10.7 |
| 23 | G3-4-5 | 1530-3 | " | " | 12.7 | 8.6 | 14.8 | 11.8 |
| 24 | G3-4-5 | 1560-3 | " | " | 12.5 | 8.2 | 14.4 | 11.5 |

Thermal Shock: Average 5 Pans  Blend G2-3: G2-50 G3-50
Impact: Average 5 Pans, 10 Spots each Pan  Blend G3-4-5: G3-⅓, G4-⅓, G5-⅓
Steel: A

### Thermal shock

From Figure IV it can be seen that for a single coating, resistance to thermal shock decreases slightly for the first increase in expansion of the cover coat and rapidly for subsequent increases. For all cover coats there is a marked decrease in thermal shock resistance for an increase in thickness obtained by applying a second coating of the same enamel. This decrease in resistance has a tendency to become less marked for additional thickness at higher expansions.

The results for all cover coats and their combinations have been plotted using thickness versus thermal shock resistance in Figure V. In this case expansion has been disregarded and the information is surprising in its regularity and is of considerable interest. Here again the resistance to thermal shock decreases for both one and two coats of the individual enamels from C1 to C4 with the apparent influence of thickness upon the results. For the combination of enamels, it shows that C1 is superior to C2 as a final coating even though the coatings were heavier in all cases. The fact that C3 coated with C1 gave slightly higher results than C2 coated with C1 may seem somewhat out of order, but it confirms the work which had been done with commercial enamels. These results indicated that it was desirable to have the expansion of the first cover coat close to that of the ground coat rather than close to that of the final cover coat. Therefore, from these considerations, it appeared advisable to choose C3 as the first coat and C1 as the final coat for further trials.

### Impact

From this series only one pan was made for the test on impact resist-

*to Page 56* →

# A new Canadian enameling plant
## for sanitary ware and jobbing

**a plant designed to produce 50% sanitary ware and 50% general jobbing work**

*By A. T. Gelz* • PLANT SUPERINTENDENT, ALLIANCEWARE LTD., VANCOUVER, CANADA

ALLIANCEWare, Ltd., of Canada, is an affiliate of AllianceWare, Inc., Alliance, Ohio. Ours is the first general job porcelain enameling plant in Western Canada, and it is our intent to specialize in all manner of jobbing work, including signs, architectural porcelain and other contract enameling, together with the production of steel sanitary ware.

By arrangement with AllianceWare, Inc., we import partially fabricated bathtubs, sinks, etc., and complete the fabrication and porcelain enameling here in Vancouver. We have the selling rights for the AllianceWare line in the four western provinces. The market in this area, and prospects for continued production on sanitary ware, are extremely bright for some time to come. Jobbing ware available in this area includes table tops, neon signs, refrigerated show cases and stove parts, hampered now only by the shortage of steel.

Our plant comprises approximately 36,000 square feet and is situated in the industrial district of the city of Vancouver. The officers and directors of our firm are: Frank M. Ross, president; C. J. Rodman, vice president; R. E. Strain, managing director; and J. H. Lawson, Col. V. N. Spencer, W. H. Brett and W. H. Bowden, directors. Messrs. Rodman, Brett and Bowden are also principals of AllianceWare, Inc.

The new porcelain enameling plant is laid out primarily on the basis of operating 50% on general jobbing work and 50% on porcelain on steel sanitary ware. At the present time, due to the shortages of steel and general jobbing work, and an excessively large demand for bathtubs and sinks, the entire plant is operating on sanitary ware only.

### Black shapes nested for shipment

Black shapes are received, in the case of the bathtubs, from the United States in a partially fabricated condition. All end braces, wall lugs, corner pieces, etc., are left off the shapes at Alliance in order to facilitate nesting for shipment.

On arrival in Vancouver, the bathtub is placed in a specially designed jig and the supplementary parts are welded, using one operator at each end of the tub employing Hobart electric welding machines. Welds are then polished with air wheels and the bathtubs are placed four at a time in pickling baskets preparatory to the cleaning and pickling operations.

### Pickle room tanks have individual exhaust ducts

Pickle room tanks have individual exhaust ducts, steam and fumes being drawn from both ends of tanks and up through the roof. Our fan blower exhaust, placed on roof, produces a volume of 43,000 C. F. M.

At the present time we have eight tanks in our pickle room set-up, with provisions made for an additional cleaner and acid tank when the need arises. We have four wood and four steel tanks. Wood tank sizes are 13′-4″ long, 4′-10″ wide 5′-2″ deep. Three of the steel tanks are 13′ long, 4′6″ wide and 5′-0″ deep. The cleaner tank is 13′-0″ long, 5′-6″ wide, 5′-0″ deep.

The greater width of the cleaner tank is to take care of heating coils which are placed on its side. All other tanks have steam coils placed on bottom of tanks with the exception of the dryer tank, where we use two blast heater radiators with fan blower and ducts placed along bottom of tank to dry our pickled ware as it comes out of neutralizer.

Our pickling system is as follows:

*Steam heated throughout;*

*Cleaner and water rinse tanks are steel;*

*Sulphuric acid and water rinse are wood, acid tank being lead lined, with lead coils in both tanks;*

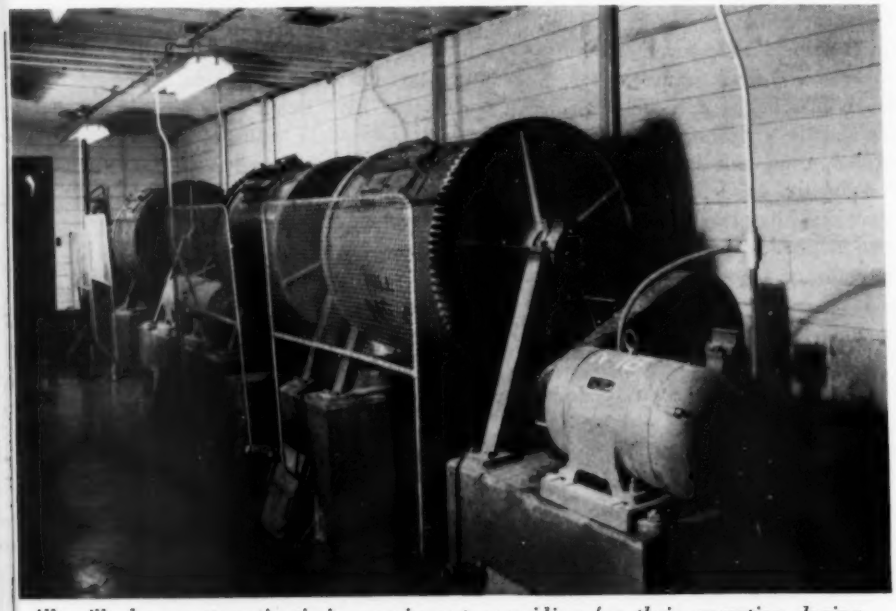
*Nickel dip rinse, wood tanks, lead lined and lead coils;*

*Neutralizer and dryer tanks, steel;*

*Pickle baskets are of monel metal with a special knockdown arrangement when pickling bathtubs. Size of baskets are 11′ long, 43″ wide, with side walls 13″ high;*

*Prime movers at the new Canadian plant include, left to right: A. T. Gelz, superintendent; R. E. Strain, managing director; and Jim Doyle and Joe Dion, foremen.*

*View of pickling shop, taken from south end, showing cleaner tank in foreground.*



*All mills have automatic timing equipment, providing for their operation during the night without the necessity of having operators on duty.*

*Cover coat spray booth for bathtubs, showing latest model water wash booth.*

*We pickle four baths at one time, along with four flat rim sinks;*

*All testing of solutions is done in our laboratory by titration.*

**Enamel Preparation**

The present mill room houses three 500 pound mills and one 300 pound mill. All have the protection of safety screens and have individual motor drives.

Our milling practice and control is as follows:

*Ground coat is milled to 7 - 8 grams residue.*

*White coat is milled to 6-7 grams residue.*

*Acid resisting white is milled to 3-4 grams residue.*

*All tests made from a 50 cc sample washed through 200 mesh screen with customary drying in our electric laboratory dryer. We use a Rotap machine which is fully automatic for our time cycle for our final sifting of washed residue.*

*The specific gravity of our enamels for sanitary ware is 169 - 171 for ground coat; 183 - 185 for white; and 183 - 185 for A. R. white.*

*For general jobbing, enamels are adjusted to suit type of work.*

*Every batch of milled enamel is tested by making a fired sample before it is unloaded from mill. We also control our application thickness of enamel with an electric thickness guage.*

All mills have automatic timing equipment complete with stop-start and jog switches. These timers make it possible to operate the mills during the night without the necessity of having operators on duty. They are set for proper milling time, based on our experience with the enamels used, and then if proper fineness has not been reached when the day shift starts and tests are run, the additional milling time required is continued during the day shift.

**Ware transported on rubber tired dollies**

After leaving the pickle room, bathtubs are placed on rubber tired dollies and delivered direct to the spray booths in the enameling shop. Ground coat is sprayed, and the ware is then transferred to the proper "jobbing

ware" or "sanitary ware" dryer, under our present system of operation.

Cover coat is applied in two 8-foot DeVilbiss water wash booths. The shop is equipped, in addition, with two 12-foot water wash booths, plus a 6-foot and a 4-foot. The two smaller booths are being used presently for sink production.

### Jobbing ware dryers

Our regular jobbing ware dryer is a conventional dryer with steam blast heaters and fan blower, which is placed at top on end and a series of ducts brought down inside under the ceiling, the heat being distributed from that point by pipes to within a few inches from the floor on side wall supports, with damper control for each individual pipe.

Sliding doors on both sides telescope into one another.

We also have a unique arrangement for both ends, which is a door the full width of the dryer. This we can lift up and out of the way with counterweighted pulley arrangement permitting us to move long and wide ware in and out of dryer from either end.

### A "two in one" dryer for sanitary ware

Our sanitary ware dryer has been called an elevator dryer. It is heated with steam blast heaters with fan blower placed on top of dryer and ducts leading down to floor the full length of the floor, plus a series of steam coils also placed near the floor.

It is, in reality, two dryers built in one with baffle division running full length centre — two doors on each side of dryer (4 doors altogether). These doors are all operated independently of each other and each has its own air hoist arrangement to move it up or down. Inside the dryer we have one elevator for each side, which can be moved up or down (also by air hoist) for desired height required to transfer baths from spray booth. With our particular lifting device, one man does this operation.

Each side of dryer will house four baths, making a total of eight — 4 ground and 4 white — two on bottom

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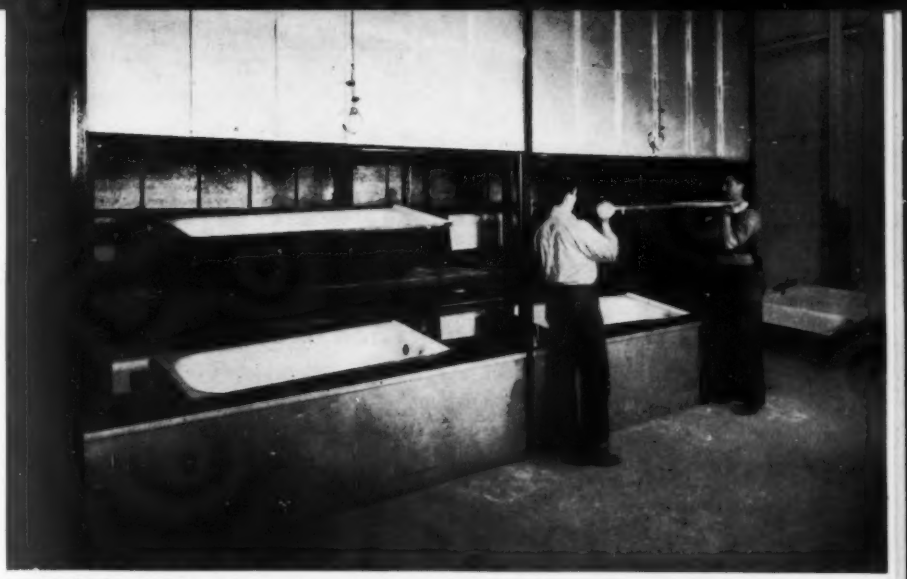
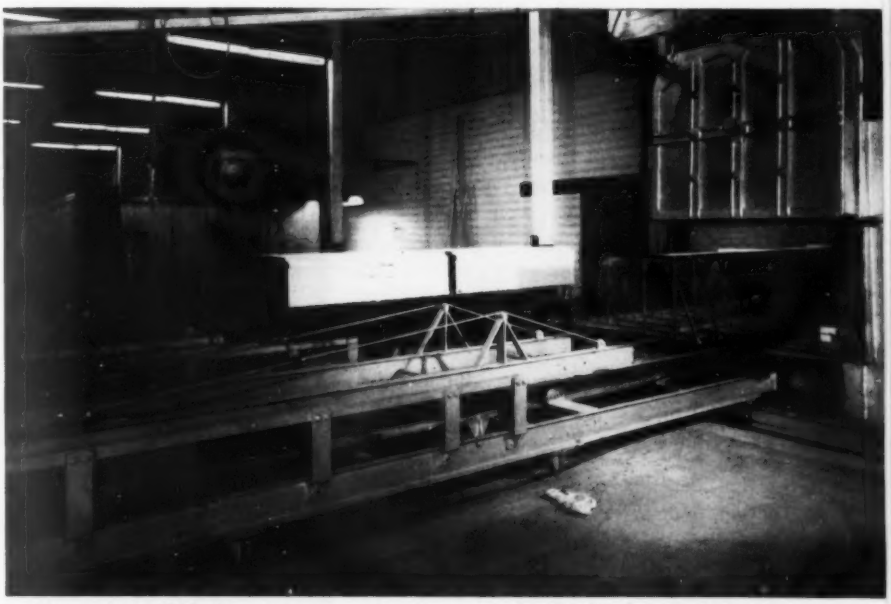


*Bathtub dryer is hot air heated. Doors and elevators are operated by air cylinders.*



*View of 300 KW electric furnace, showing method of loading two bathtubs per charge.*

*General view of enamel shop, taken from northwest corner, showing jobbing work dryer in foreground and two furnaces in far background.*

# The value of visual aptitude tests

## for industrial workers

**the results that may be expected from the application of a testing program in industry**

*By John Lambert*

THE last war proved the tremendous value of pre-determination of the capacities and aptitudes of men and women in wartime activities, particularly in industry and in the fighting forces. Evaluation of merit ratings alone opened up entirely new fields of study, certain to be invaluable for peacetime industrial efficiency as well as for the benefit of our masses of workers themselves.

Job analysis and time study, too, have become an integral and vital part of industrial and commercial activity and management. But, perhaps there is no factor in such a series of personnel studies and surveys of greater importance than the *visual aptitude* tests, which are almost universal in their importance to all human activities.

### Visual efficiency factors

Consider that regardless of occupation, commercial or industrial, these figures of visual efficiency (according to age) prevail as a basis for the personnel manager: *(see table at the bottom of page)*

However, it should be remembered that, while visual acuity may be satisfactory in many instances, vision *depth* defectiveness may increase with age.

Great strides have recently been made in improving occupational aptitude surveys through *visual* or optical methods.

Occupational aptitude surveys are not new to industry, though good progress was made during the war in speeding up such tests, making them more scientific and adapting them in the present day personnel needs of highly technical industrial production.

One significant advance along this line is the development of an occupational *visual* ability survey technique, a system which not only saves time in processing groups of prospective employees, but also greatly aids the personnel or employment department of any plant in proper placement. While there are variations of this system to meet present day demands in industry, the occupational visual survey telebinocular has numerous special features, as explained by Gifford Mast, whose staff is conducting long experiments and helped to bring the equipment up to its present day efficiency.

The visual system has proved its value in thousands upon thousands of occupational tests among employees of such concerns as General Electric, American Viscose Co., Talon Inc., and over 2200 other industrial concerns with from less than 100 to more than 50,000 employees. It is accepted among personnel leaders that the system offers good opportunities for "screening" new personnel in the trade.

*There are new techniques and new equipment for visual aptitude tests.*

### The visual survey method

The problem of testing visual ability and recommending correction when needed (with particular regard for those problems involving the coordinated use of both eyes — problems of stereopsis) has long been a factor where accurate vision is important. To meet such problems, there have been developed "standardized" tests for visual aptitudes

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Under | 20 | years | of | age | 3 | out of | 10 | persons | are deficient |
| 20 to | 30 | " | " | " | 4 | out of | 10 | " | " " |
| 30 to | 40 | " | " | " | 5 | out of | 10 | " | " " |
| 40 to | 50 | " | " | " | 7 | out of | 10 | " | " " |
| 50 to | 60 | " | " | " | 8 | out of | 10 | " | " " |

# National sign convention is big success

ONE of the most "up and coming" associations related to the porcelain enameling industry is the National Electric Sign Association, which held its convention and exhibit at the Congress Hotel in Chicago, February 3, 4 and 5, with an attendance of over 600.

### Akron man to head association in 1947

H. B. Link, executive vice president of Bellows Electric Sign Corp., Akron, Ohio, was re-elected president during the convention. Other officers elected were: vice president, Jake C. Allen, president, Southern Neon Displays, Inc., Atlanta, Ga.; secretary-treasurer, Roger C. Hunt, president Neon Signs, Louisville, Kentucky. Maurice R. Ely will continue to serve as executive secretary.

Five new directors were elected. They are: Jake C. Allen; Milton M. Kraus, vice president, Broadway Maintenance Corp., Long Island City, N.Y.; E. J. Schulenburg, president, Time-O-Matic Co., Danville, Ill.; J. D. Traylor, general manager, Donnelly Electric & Mfg. Co., Boston, Mass.; and H. H. Wineburgh, president, Texlite, Inc., Dallas, Tex.

### Two enameling plants exhibit

The NESA exhibit included attractive displays of over thirty companies representing all types of signs and sign equipment.

In the display of Barrows Porcelain Enamel Company, Cincinnati, Ohio, were multi-colored signs for automobile dealers service and foods, and combination porcelain enamel-stainless steel channel letters.

Another company representing porcelain enamel products was McMath-Axilrod Corporation, Dallas, Tex., in whose booth was the familiar "flying red horse," soft drink signs and porcelain enameled channel letters. Photos depicted the rapid growth of the company during the past year.

### Maintenance problems spotlighted

The subject for Monday's program was "Maintenance Problems." The first speaker was Walter M. Thomas, The Coca-Cola Company, Atlanta, Ga. We then heard Paul R. Fritsch, of Goodyear Tire & Rubber Co., Akron, Ohio, who gave the sign men many constructive suggestions for their contacts with national sign advertisers and stressed the importance of "preventative maintenance," the object of which is to keep a sign in new condition, top notch cleanliness for maximum effectiveness, to head off expensive repairs and keep operating costs low.

Said Fritsch, "A profusely illustrated, well written pamphlet or booklet on the subject of preventative maintenance should be presented to the customer when the new sign is installed . . . *(This might prove to be a valuable idea for the architectural porcelain enamelers as well.)*

"Taking all signs as a whole, illuminated and non-illuminated, we (at Goodyear) have a rough 'rule-of-thumb' that for each dollar of appropriation for signs there must be another dollar for erection and maintenance . . . $25,000 worth of signs properly erected and well maintained are of greater value than $50,000 worth of signs, 'period.' Our experience over a twenty-year span proves it in plain, honest figures; *we get the most sign value for our money that way.*"

M. M. Kraus, vice president and general sales manager, Broadway Maintenance Corp., got down to brass tacks on the subject of maintenance by citing costs for the various steps in a sign maintenance program. He emphasized the need for a uniform maintenance policy and stressed the point that "maintenance must be looked upon from the long-range point of view."

NESA has been conducting a survey among association members so that the sign manufacturers may have an interchange of information on maintenance problems and develop, insofar as practical, a uniform maintenance contract.

### Whirlwind speakers talk on "selling advertising"

Wednesday afternoon's program on "selling advertising" had George K. Comstock, president of Electrical

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*At the speakers' table for Wednesday's NESA luncheon are: Maurice Ely, C. P. Fisken, George K. Comstock, R. S. Williams, H. B. Link and Jake C. Allen.*

*At the speakers' table in Cleveland are: Dany, Meeker, Howe and Gredys.*

# OHIO

*Toledo Porcelain's Pete Beier.*

*Jay Simons, Westinghouse; Elmer Dany; and Apex's Jack Trees.*

*Gene Punderson and Wilbur Horner.*

*Above: Pemco's Harold Geraud. Center: Stan Penton, of Cameo, and Speaker Underwood.*

*California Metal's Bud Blackburn with C. Clark and J. Moore, of Western Stove.*

# CALIFORNIA

*Norris Stamping "gang" out in force. L. to R.: Tiny Wareham, Jo Disero, Ed Wilken, Glen Fulton, L. H. Howard and C. H. Rudd.*

*Secretary Burlingame signs up Peterson of Oakite Products and Garth of DeVilbiss.*

# Meeting with the enamelers clubs

ALL four of the active Enamelers Clubs scheduled meetings during January and February. The Central Club was first with its meeting on January 17, followed by the Pacific Coast Club on January 31. As *finish* goes to press the Chicago and Eastern Clubs will be holding meetings in Chicago and Philadelphia, respectively — February 15.

## Central District Enamelers Club

A GREAT turnout was reported for the Central District Enamelers Club meeting held January 17 at the Lake Shore Country Club, Cleveland, Ohio. Approximately one hundred and twenty-five members and guests were present for the dinner and program.

Subjects covered by the speakers were "mill additions" and "porcelain enameling furnaces."

E. E. (Gene) Howe, assistant director of research, Chicago Vitreous Enamel Product Co., in his discussion "Materials Used as Mill Additions in Porcelain Enamels," covered in detail the functions and qualities of the many chemicals and raw materials used as mill additions in the industry's porcelain enameling plants.

Elmer W. Dany, chief engineer of the Ferro Enamel Corporation, in his discussion "Enameling Furnaces and Design Problems," compared today's continuous furnaces with those of earlier design, and outlined some of the advantageous features of the more recently designed equipment. His discussion covered furnaces of both "U" and "straight through" types.

### Advantages of baffles

Reference was made to the recent installation of a "center wall muffle" in a "U" type furnace.

It was indicated that "baffles" hung on the conveyor of a continuous furnace, at right angles to the direction of ware flow, produce provable and liberal savings in operating costs. The speaker cited one high-sidewall furnace installation where oil consumption was reduced approximately 25% through the use of this type of baffle.

Other suggestions included the use of gold safety fuses as temperature-limiting devices and an added safety feature to prevent damage to furnaces in the event automatic control equipment should fail.

### Fifty furnaces in two years

Mr. Dany presented the figure of fifty continuous furnaces which have been added to equipment in the porcelain enameling industry during the last two years, an increase of 50 per cent in the number of continuous type furnaces in pre-war operation.

He pointed to the rapid expansion in the industry with its many millions of dollars in new equipment, and illustrated the increase in furnace capacities by referring to current furnace capacity of 34,000 pounds gross weight of ware and tools per hour compared with capacities of 14,000 pounds from furnaces formerly considered "large."

The final feature on the program was the presentation of the Ferro sound slide film "Modern Porcelain Enameling." *(See "Eastern Enamelers Club Meeting," page 42, July, 1946, finish.)*

### March meeting announced

The next regular meeting of the Club will be held on March 7, at the Lake Shore Country Club. One of the speakers will be Edward Mackasek, managing director of the Porcelain Enamel Institute.

## Pacific Coast Enamelers Club

THE Pacific Coast Enameler's club held their fifth meeting since organizing, and their first 1947 business meeting, on January 31, at Lynwood, California. Forty persons were present, including 36 old members, two new members and two visitors interested in hearing the speaker of the evening. The two new members, C. A. Peterson, of Oakite Products Co., and M. L. Garth of DeVilbiss Company, were given a rousing welcome into the fold.

When the meeting was opened, President Glen Fulton suggested a rising vote of thanks to the committee members who were responsible for the success of the Christmas party held December 12th. Fulton pointed out that, insofar as he was aware, this type of party, including member's wives and adult friends, was something new in enameling club circles. "The occasion is something we'll remember," Fulton declared. "I heartily recommend the procedure to other clubs." The party was attended by approximately 75 persons, and this despite the fact that heavy fog made driving a rather dangerous proposition. (Chamber of Commerce notwithstanding.)

### Joint meetings of enamelers club and ACS considered

Secretary Burlingame announced that the next meeting would be held March 28th, and asked for a discussion relative to meeting once or twice each year with members of the American Ceramic Society. It was pointed out that while there is some divergency of interests between the two groups, there are subjects of vital interest to both. It was decided that if a speaker could be chosen to cover a mutual interest subject, such joint meetings would be practical and desirable.

With current business out of the way, President Fulton selected a committee to handle affairs of the "Fiesta" meeting, or club picnic, to be held May 24th. He charged the committee to outline a good program,

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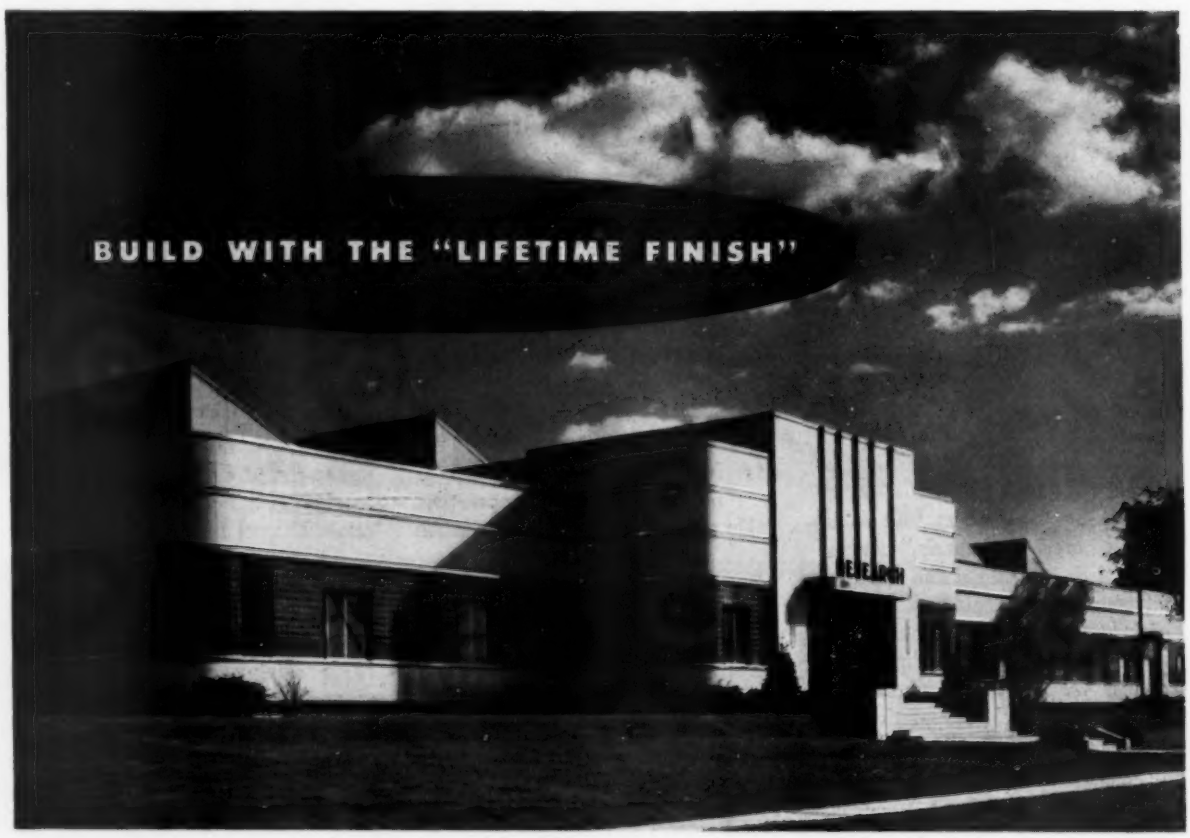
# The answer to

ON November 5, 1937, we had the privilege of attending dedication ceremonies for the then new Armco Research Laboratories at Middletown, Ohio. At a formal dinner for the guests present, we heard Charles F. Kettering, of General Motors, describe research as "an insurance policy for industry," and point to the profound effects of long-term research programs on industrial progress as a whole.

It seemed entirely fitting that, in the design of the spacious laboratory building, Armco should use the results of research and development in the steel and allied fields.




*The Armco Research Laboratory features light yellow porcelain enameled side walls contrasted with black porcelain enameled pilasters and stainless steel trim.*

### Porcelain enamel used effectively

It should be remembered that while porcelain enamel was used for architectural purposes before 1937, it had not in any sense reached its present stage of development, nor was it an accepted material in the architectural profession. It will be easy to appreciate, therefore, the attention and admiration accorded this new, modern and colorful building with its smooth, attractive finish of porcelain enamel and design relief in stainless steel.

Through the application of the newest building materials available in 1937 — beautiful porcelain enamels, stainless steels and glass blocks — true architectural distinction was achieved. The single-story structure, enclosing 43,500 square feet of floor space, is of welded steel frame construction and provides unusual daylight working conditions by the use of saw-tooth sections, in units 175 feet long and 10 feet high, closed in with glass block. Impressive wide radii or arcs replace the conventional sharp corners.

In this single installation there is 600 lineal feet of cream-colored porcelain enameled sidewall with contrasting black porcelain enameled pilasters and bands of stainless steel, enclosing the three sides facing streets.

A massive square entrance tower dominates the principal facade. Here, vertical shafts of porcelain enameled iron, recessed between narrow strips of stainless steel, extend upward to its full two-story height from a semi-circular marquee of stainless steel.

### Completely modern

Sheet steel partitions subdivide the building into almost 100 rooms. Year-round air conditioning insures uniform temperature throughout the building, which provides space for offices and conference rooms for laboratory personnel.

Steel wall panels are welded to square metal tubing, and are packed with a mineral insulating material.

# ...an architect's dream of a maintenance-free building material

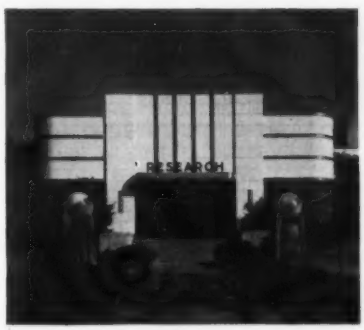
*By Dana Chase*

Exposed ceilings on the interior of the laboratory are also metal panels. The bottom of each panel section is perforated with ten 3/32″ diameter holes per square inch of surface for acoustical properties.

### A return trip

In the fall of 1946, just nine years after the dedication of this modern porcelain enameled structure, we made a return inspection trip to get a first-hand picture of the present condition of the building exterior.

It can be said without qualification that except for the fact that surrounding landscaping shows nine years of growth, a visitor would have no way of telling that the building was not an entirely new structure, just recently completed. The color, texture and general appearance of the building is "like new" after nine summers and winters and, from all indications, will remain "like new" for years to come.




*These two photographs were taken in the fall of 1946, immediately following the "return trip" described in this article, and approximately nine years after the photo on the opposite page was taken.*

### How about maintenance?

In talking with Dr. Anson Hayes, vice president and director of the research laboratories, we raised the question of maintenance. To this he said, "No manual cleaning has ever been necessary. The rains take care of that. And, with the exception of caulking some of the joints once during this period, there has been no upkeep on the exterior surfaces."

That's why we say that the proper use of architectural porcelain enamel with other appropriate materials can result in "the answer to an architect's dream of a practically maintenance-free building material."

→ *from Page 31*

and warned all members to come "dressed in their worst." So far the club has adhered rigidly to its charter plan to segregate business meetings from pleasure meetings so that each might serve a full and functional purpose.

### Milling practice discussed

Fulton then introduced E. M. Underwood, of Patterson Foundry and Machine Company, as speaker of the evening. Underwood's paper covered ball mills, their capacities, ball charges, ball sizes, discharge arrangements, pressure, speed and horsepower, and enamel storage. He discussed a new grinding medium said to be harder and approximately twice as dense as porcelain, the original cost of which is approximately three times that of porcelain. Principal use at present is in the paint industry.

Following Underwood's talk, a lengthy discussion arose concerning ball sizes and their relation to grinding speeds. R. R. Sherrill, Ferro Enamel Corporation, explained the action of the different size balls during grinding. The larger balls, he said, speeded initial grinding due to their ability to break down the larger sized frit particles. But as grinding proceeds the smaller size balls take over most of the work due to their more numerous contact points. He intimated that for theoretical optimum grinding speed, ball size should grow smaller as the process proceeded. Underwood explained that continuous grinding mills operating on this principle were available for the mining industry, but so far had not proved successful in frit grinding operations.

M. E. "Bud" Blackburn, of California Metal Enameling Co., brought up the subject of balls going "flat" after extended use. Underwood explained that this was undoubtedly due to using too slow a mill speed, thus causing the balls to slide rather than roll over each other. Several members voiced a doubt that "flat" balls should be used for further grinding operations.

All in all, Underwood's talk was very interesting and informative, and the interchange of ideas after his speech brought to light many bits of valuable experience gained by several of the members.

## Chicago District Enamelers Club

THE meeting room at the Graemere Hotel was well crowded with enamelers at the Chicago Club's meeting on Saturday, February 15. They were rewarded by an outstanding program.

### New officers elected

A short business meeting followed the luncheon during which Ed Bolin, general chairman of the Maypole Party committee, announced plans for the first annual Maypole Party since the war. It is scheduled for May 9, at the Chateau, in Lyons, Illinois. An outstanding social meeting is promised by the committee, with dinner, special entertainment and many door prizes.

George Tuttle, secretary and treasurer, reported finances of the Club in excellent condition, and a new high of 160 in memberships for the past year.

The retiring officers were heartily congratulated for the effective leadership which has brought the Club to a new high in membership and interest.

Dwight Bennett, University of Illinois, and chairman of the nominating committee, reported for the committee, which consisted of Lee Huyck, Huyck Construction Co., and Russ Hartwig, of Benjamin Electric Mfg. Co., and presented the following slate of officers for the new year:

President—Wayne Deringer, A. O. Smith Corporation.

Vice President — Jerry Hofstetter, Ferro Enamel Corporation.

Secretary-Treasurer — Ed Bolin, Chicago Vitreous Enamel Product Co.

Assistant Sec.-Treas.—Marcel Pouilly, American Stove Company.

The Club voted unanimous acceptance of the slate as prepared.

### A lesson in quality control

W. E. Jones, president of Management Controls, Des Plaines, Illinois, and past president of the Chicago Society of Quality Control, gave an absorbing illustrated presentation on how statistical quality control can be applied to porcelain enameling.

The meeting room quickly became a class room under Mr. Jone's guidance, and through a detailed and completely illustrated presentation Club members had an excellent opportunity of gaining a clear insight into what would have appeared to be a very complicated and awe-inspiring problem under less experienced handling. The presentation served to demonstrate a new approach to putting quality control on a factual basis. It was demonstrated clearly that quality must be *built* into your product—that it can not be *inspected* into it. Machines, materials, men and methods are all potential causes of trouble in any plant.

Mr. Jones illustrated the rapid acceleration in attention to statistical quality control by referring to the first book on the subject printed a number of years ago which had little attention for several years. Then, about 1939, Westinghouse started a comprehensive system of quality control *(See November, 1945, finish — "A Workable System for Developing New Products," by R. F. Bisbee).*

War brought new interest through WPB courses in 1943. In 1946, a national society was formed with 2,000 members and 25 local groups. Last year saw 60 articles and books published on the subject.

Three of the principal statistical tools are: (1) frequency distribution (determination of what a machine or process is capable of doing), (2) control charts (to keep the process doing what is expected of it), and (3) sampling tables.

It would be impossible to cover the scope of the presentation in this brief report. It can be said that it included a convincing demonstration of how statistical methods can be effectively used to increase quality, lower costs and produce a more uniform product at the maximum capacity of any given process.

One interesting point is the fact that a control sheet in this system is the basis for taking action on any results falling outside the established

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# The Washington round-up

*By Wilfrid Redmond*

PRESIDENT Truman, in a special message to Congress, recently asked for continuation of controls over antimony and tin beyond March 31, when the directive powers of CPA expire. Tin, of course, may not be expected to be in normal supply for probably two years. Stocks are down to 22,000 tons. Uncontrolled tin consumption, CPA estimates, would require 90,000 tons in 1947.

Supplies of antimony will be short of requirements of about 45,000 tons in 1947. China is not producing antimony in pre-war volume. This was our main source of supply.

The Government will continue purchase programs for both tin and antimony during 1947.

Some new soda ash capacity may come in about July to relieve the present shortage which amounts to 15 per cent of consumption for all users. With the expiration of CPA priority powers March 31, there may be some change in the supply situation with consumers in territories adjacent to producers receiving the benefit.

### Steel for housing items — 304,000 tons

On March 31, CPA will terminate allocation of steel for the housing program and industry will take over distribution in a voluntary agreement to supply manufacturers of housing materials. The housing critical materials list will be the same as heretofore, with the exception of sinks and under cabinets. Steel producers have agreed to supply approximately 304,000 tons of steel for the housing items, including 40,000 tons for prefabricated steel houses. The controlled program in the first quarter provided for 295,000 tons of steel. If steel mills, however, fall down on the assignment to supply steel in the required amount for the housing program, CPA will invoke its directive powers to force these producers to meet their commitments, it is said. CPA has these directive powers over housing materials until June 30, and the Office of the Housing Expediter may exercise this authority until December 31, 1947.

The Lustron Corporation, Chicago, will produce 15,000 porcelain enamel steel houses in 1947 under a guaranteed market contract, Housing Expediter Frank R. Creedon recently announced. The Lustron houses will be fabricated in a part of the Curtiss-Wright airplane plant at Columbus, Ohio. The deal was made possible by the approval by RFC of a loan of $12,500,000 to Lustron. RFC had previously turned down a request for a loan of $32,000,000 to Lustron. Lustron expects to reach peak production of 100 houses a day by September. The production schedule calls for 100 houses in March, 225 in April, 425 in May, 800 in June, 1100 in July, 1900 in August, and 2500 in September and monthly thereafter.

### Controlled inventories out on major appliances

CPA recently revoked Order L-219 which controlled inventories of wholesalers and retailers. These items, which include mechanical refrigerators, washing machines and ranges, are restricted only to minimum working inventory requirements under PR-32. All inventory regulations will expire on March 31. President Truman did not ask for retention of inventory controls in his recent message to Congress.

The Department of Commerce reports that shipments of porcelain enameled products amounted to $6.9 million in December, a drop of 11 per cent from November. Total shipments for 1946 were also announced. They were at the highest in the past ten years, amounting to $74.4 million. The 1946 report showed activity much higher than in the prewar years, and was about twice as great as the level of activity during the war. The 1946 shipments varied from $4.4 million in February to $8.1 million in October.

December and November shipments by product follow:

| | *December* | *November* |
|---|---|---|
| Signs | $ 383,480 | $ 390,294 |
| Stove parts (sold as such) | 662,728 | 696,738 |
| Refrigerator parts (household and commercial) | 452,828 | 512,025 |
| Reflectors, including fluorescent reflectors | 405,693 | 393,965 |
| Cooking, household and hospital utensils | 2,178,414 | 2,799,362 |
| Table tops (kitchen cabinets, etc.) | 504,930 | 585,994 |
| Store fronts and other architectural parts | 163,779 | 175,869 |
| Washing machine parts | 636,026 | 666,325 |
| All other | 1,550,407 | 1,607,721 |
| TOTAL | 6,938,295 | 7,828,293 |

On the legislative scene, Congress is making the usual cumbersome approach to two main issues — labor legislation and budget balancing. Some compromise of the Knutson "20 per cent across the board cut" in income tax is indicated, with a sliding scale of reductions by brackets of income an eventuality.

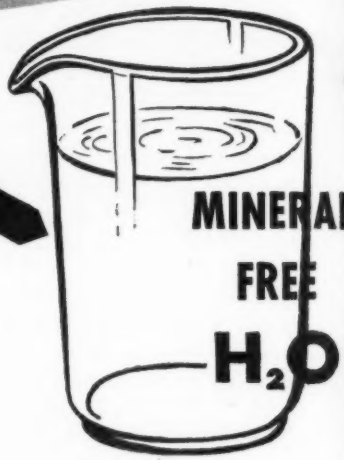
Jurisdictional strikes, secondary boycotts, industry wide bargaining, and portal-to-portal claims will be outlawed and modified. Other labor gains will be lost. The Wagner Act will be returned to its original status where it was intended, in that the employer should have certain rights which he subsequently lost through interpretations of labor-minded administrators.

### Foreign trade agreements get attention

Another issue is rapidly coming to the front in Congress. Several bills have been introduced which would prevent the negotiation of trade agreements with foreign countries, announced by the administration. Republican high tariff advocates are trying to stop the negotiations which are scheduled for this spring. But also developing is a Republican movement, led by Harold Stassen, to modify the traditional Republican high tariff policy and to end economic isolationism and to promote world trade.

RAPID, LOW-COST PRODUCTION OF

# MINERAL-FREE WATER...




# *New* FILT-R-STIL*

WATER DEMINERALIZING UNIT

# OFFERS

**"STANDARDIZED" WATER... ECONOMICALLY PRODUCED... FOR IMPROVED PROCESSING**

You can't afford to forego the benefits of standardized water . . . water chemically equal to or better than distilled—*and at only a fraction of the cost of distilled water. Better* performance at *lower* cost—that's the story behind Cyanamid's FILT-R-STIL Demineralizing units.

The process requires no heat or cooling water, and equipment does not have to be periodically dismantled to maintain operating efficiency. Hence, operation and maintenance are greatly simplified, with accurate results and sustained performance assured.

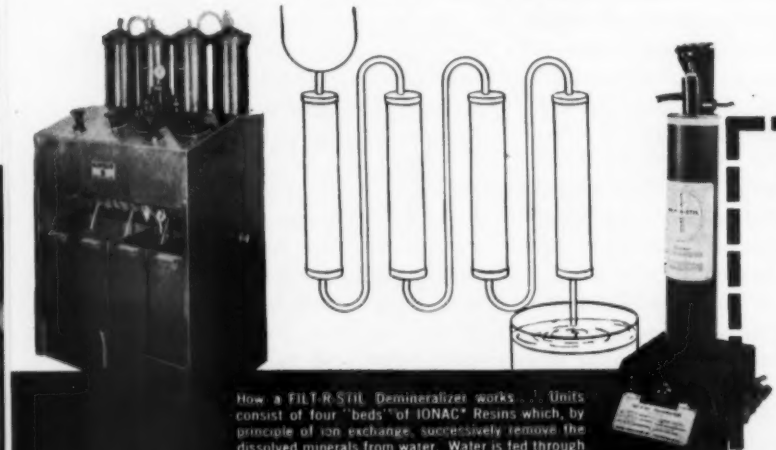
For full particulars about all types and sizes of FILT-R-STIL Demineralizing units to aid in solving your water problems—clip and mail coupon today.

**AMERICAN CYANAMID COMPANY**

*ION EXCHANGE PRODUCTS DEPARTMENT*

30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

**Reg. U. S. Pat. Off.*



How a FILT-R-STIL Demineralizer works . . . Units consist of four "beds" of IONAC* Resins which, by principle of ion exchange, successively remove the dissolved minerals from water. Water is fed through a conductivity cell which indicates quality of water being produced. When resins are exhausted, a regenerative system restores units to full efficiency.

*American Cyanamid Company* F.2
*Ion Exchange Products Dept. 10*
*30 Rockefeller Plaza, New York 20, N. Y.*

*Send me your free booklet on FILT-R-STIL.*
*Briefly, my water problem is of the following nature:*

_____

_____

_____

*Name* _____

*Company* _____

*Address* _____

*City* _____ *State* _____

# NEWS

### New Renown Stove P. A.

E. R. Bisard has been promoted to the position of purchasing agent for the Renown Stove Company, Owosso, Michigan, according to a recent announcement by B. A. Nagelvoort, president of the company. Mr. Bisard has been with Renown since March. 1936.

---

C. B. Rollins, formerly with Phillips & Buttorff, is now associated with Nashville Wire Products Company, Nashville, Tennessee.

---

### Gallaher new Quadrangle executive

The Quadrangle Mfg. Co., Chicago manufacturers of porcelain enameled lighting reflectors and specialty lighting, announces the election of J. R. Gallaher as secretary of the corporation. Gallaher has been associated with the company since 1938, except for the war years when he served in Army communications at various Canadian and Alaskan bases.

---

### Bennett S. Chapple, Jr. advanced

Appointment of Bennett S. Chapple, Jr., as assistant vice president-sales, United States Steel Corporation of Delaware, was announced by David F. Austin, vice president.

Following his graduation from Antioch College in 1927, Chapple served in various capacities with the American Rolling Mill Company until 1936, when he joined the sales department of Carnegie-Illinois Steel Corporation as manager of sales promotion.

In 1944 Mr. Chapple resigned to become assistant to the president of the Firth Sterling Steel Company. In 1945 he joined the staff of the vice president in charge of sales, of his present connection.

---

### McKee new Hommel vice president

The O. Hommel Company, Pittsburgh, Pa., has announced the appointment of John McKee as vice president in charge of porcelain enamel sales.

Prior to his new position, McKee was associated with the Norge Division of Borg-Warner Corporation for fifteen years in the sales and purchasing departments. A native of St. Louis, Mo., he attended Wm. Jewell College and Cornell University. After leaving school, he worked for the U. S. Rubber Company as salesman and district and division manager.

John McKee is familiar to stove and appliance manufacturers as well as many enameling industry members.

---

### Heckathorn and Morrow on Mullins' board

Harry M. Heckathorn and Charles A. Morrow, vice presidents of Mullins Manufacturing Corporation, Salem and Warren, Ohio, have been elected to the firm's board of directors George E. Whitlock, president, announces. Heckathorn is executive vice president of the corporation, and Morrow is vice president in charge of merchandising for the Youngstown Kitchens division. Both live in Warren.

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The appointment of Dr. Laurence C. Hicks as assistant director of research of the Allegheny Ludlum Steel Corp., has just been announced by Frank B. Lounsberry, vice president and technical director.

Dr. Hicks has been with the organization since 1933.

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### O. S. U. professor takes industrial post

Professor Oscar D. Rickly, on the staff of Ohio State University's department of industrial engineering since 1919, has resigned to become general manager of the L. H. Marshall Company, of Columbus, manufacturers of pyrometric equipment.

Rickly, who took his master of science and bachelor in mechanical engineering degrees from Ohio State, is a native of Bluffton, Ohio.

---

### Brown adds 38 new sales and service engineers

The Brown Instrument Company, Philadelphia, has announced the appointment of 38 new sales and service engineers to 23 of its branches throughout this country and Canada. W. H. Steinkamp is field sales manager.

All 38 of the newly assigned sales and service engineers have just com-

pleted an intensive course in industrial instrumentation at the Brown Instrument School, from which many industrial engineers have graduated during the past 11 years. The course comprised specialized instruction in addition to the previous technical education of each engineer.

---

### New Cribben and Sexton vice president

George D. Wilkinson, chairman of the board of directors, has announced the election of Wendell C. Davis as vice president of Cribben and Sexton Company, manufacturers of Universal gas ranges.

Davis joined the company as controller in 1942. He was elected treasurer in January, 1943, and became a member of the board of directors in 1946.

Prior to joining the company in 1942, he was engaged as controller and member of the board of directors for a distributor of petroleum products.

Davis will continue his present duties as treasurer and controller of the company.

---

### Dr. Shutt to Foote Mineral

Foote Mineral Company, Philadelphia, announces the appointment of Dr. Richard S. Shutt as director of research.

Dr. Shutt is responsible for planning and coordinating the products research and development programs the company has initiated. He holds a PhD. degree in Physical Chemistry from Ohio State University. His experience includes responsible executive positions with Battelle Institute, Columbus, Ohio; The Glidden Company and E. I. du Pont de Nemours Co.

---

Carnegie-Illinois Steel Corporation has announced the appointment of James M. Darbaker as manager of Chicago district operations, to succeed Walter E. Hadley who is retiring. The change in the regional operating management of this United States Steel Corporation subsidiary became effective February 1. Darbaker has been assistant district manager at Chicago since 1943.

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### DeVilbiss offers three courses for industrial finishers

The DeVilbiss Company, Toledo, Ohio, will conduct three one-week courses in a School of Spray Painting for industrial finishers. These will start March 10th, May 12th and June 23rd, each covering the same classroom instruction and shop work. A fourth and earlier course was held January 13th.

Courses are given without charge to users of DeVilbiss Spray Equipment. All interested should write for reservations.

---

### New industrial design firm

Onnie Mankki, A. I. A., announces the opening of an office for the practice of industrial design and architecture at 7113 Euclid Avenue, Cleveland 3, Ohio. Mankki was formerly vice president and director of Industrial Design for Designers for Industry, Inc.

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The appointment of Miss Mary E. Brokaw as home economist for the National Enameling and Stamping Company has been announced by Mr. E. G. Gardner, vice-president in charge of manufacturing.

Miss Brokaw will direct the activities of newly remodeled NESCO test kitchens and, in addition, will work with the research and engineering departments on the development of new products.

### Electromaster advances three veteran employees

It was recently announced by H. H. Hubbard, vice president of Electromaster, Inc., that three employees of the firm have been promoted to assistant factory superintendents.

From left to right in the accompanying photo are: Gino Guerrini, L. B. Colvin, and Nicholas Gores.

Guerrini (13 years' service) is responsible for finishing operations — porcelain enamel and paint; Colvin (13 years' service) is in charge of all press and welding operations; and Gores (17 years' service) is in charge of assembly operations.

These three men, totaling 43 years of experience, are serving under E. A. Gartha, plant superintendent.

## Sullivan nominated to lead A. C. S.

The Board of Trustees of the American Ceramic Society recently nominated the following men to the offices indicated: president; John D. Sullivan of Battelle Memorial Institute, Columbus, Ohio; vice-president; John W. Whittemore, of Virginia Polytechnic Institute, Blacksburg, Va. W. E. Cramer, of the Industrial Ceramic Products, Inc., Columbus, Ohio, has been renominated treasurer of the society. Charles S. Pearce continues as general secretary.

The meeting of the board shown in the accompanying photograph was held at Battelle Memorial Institute. Those present were: first row: (L. to R.) J. E. Hansen, Ferro Enamel Corporation, Cleveland, Ohio; J. W. Hepplewhite, Edwin M. Knowles China Co., Newell, W. Va.; R. M. Campbell, New York State College of Ceramics, Alfred, N. Y.; Theodore Lenchner, Vitro Manufacturing Company, Pittsburgh, Pa.; F. R. Porter, Inland Steel Co., Indiana Harbor, Ind.; J. H. Isenhour, Isenhour Brick & Tile Company, Salisbury, N. C.; J. S. Gregorius, Pittsburgh Plate Glass Company, Pittsburgh, Pa. Second row: (L. to R.) John D. Sullivan, Battelle Memorial Institute, Columbus, Ohio; Ross C. Purdy, Columbus, Ohio; John L. Carruthers, Ohio State University, Columbus, Ohio; Robert L. Stone, Technical Secretary, The American Ceramic Society, Columbus, Ohio; C. Forrest Tefft, The Claycraft Company, Columbus, Ohio; Charles S. Pearce, general secretary, The American Ceramic Society, Columbus, Ohio; W. E. Cramer, Industrial Ceramic Products, Inc., Columbus, Ohio; L. C. Hewitt, Lacledе-Christy Clay Products Company, St. Louis, Mo.; E. M. Rupp, Columbus, Ohio; H. M. Kraner, Bethlehem Steel Corp., Bethlehem, Pa.

Not present: E. H. Fritiz, Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.

### American Ceramic Society 49th annual meeting

The 49th annual meeting of the American Ceramic Society will be held in Atlantic City, New Jersey, April 21 to 25, 1947. Reservations for this meeting should be made at once.

The Institute of Ceramic Engineers will meet Monday afternoon. The reception for Division and Local Section officers and Committee chairmen will be held Monday evening. The general session will be Tuesday morning and the Division meetings will open Tuesday afternoon. Division meetings will close late Thursday.

Five hotels are cooperating, the Traymore, the Brighton, the Clarridge, the Marlborough-Blenheim and the Dennis. Headquarters will be at the Traymore, but all *General* and *Division Meetings* will be held at the *Convention Hall.* All other Atlantic City hotels will accept reservations.

### A. C. S. Pittsburgh section to hear patent attorney

The Pittsburgh section of the American Ceramic Society met in Mellon Institute Auditorium, Tuesday, January 14, 1947 with 127 present, according to a report from J. S. Nordyke, section secretary.

Announcement was made that the speaker for the March meeting will be Walter J. Blenko, patent attorney of the Pittsburgh law firm Stebbins, Blenko and Webb. Mr. Blenko will discuss current trends in patent law, a topic of real interest to all ceramists.

### New officers ACS Trenton Section

At the annual meeting of the Trenton Section of the American Ceramic Society, the following officers were elected for 1947:

Councilor — Fred A. Whitaker
Chairman — Ogden A. Kantner
Vice Chairman — H. S. Magid
Sec.-Treas. — Roland E. Tucker

The next meeting is scheduled to held in March.

John H. Schneider, former major in the United States Army Air Force, has joined the sales service staff of the Special Chemicals Division of the Pennsylvania Salt Manufacturing Company, William P. Drake, manager of sales, announced.

### Director of research at Detrex

Doctor W. L. McCracken has been appointed director of research and manager of alkali manufacturing by Detrex Corporation, Detroit, according to an announcement by A. O. Thalacker, vice president and general manager.

The promotion gives McCracken

# PROTECT THOSE VALUABLE FINISHED PRODUCTS With the Right Box or Crate

★

PLYWOOD

WIREBOUND

HINGE CORNER

NAILED CRATES

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Consult with our packing engineers on product protection — Our designing and testing laboratory is at your service, without obligation.

CHICAGO MILL AND LUMBER COMPANY

33 South Clark Street Chicago 3, Illinois

*Plants at:* Helena, Ark. • Greenville, Miss. • Tallulah, La. • Rockmart, Ga. • Chicago, Ill.

complete charge of chemical research and development engineering, as well as the chemical manufacturing operations carried on at the Detrex Hillview Plant. This includes the activities of the industrial metal cleaning division. He will serve under C. F. Dinley, Sr., vice president in charge of research and engineering.

### Two new appointments at Eljer Company

*production superintendent*

Two new appointments to responsible plant positions at the company's Ford City plant were recently announced by Eljer Co. They are Charles V. Myers, production superintendent, and A. W. Witzemann, ceramic engineer.

*ceramic engineer*

Both men are graduates of Ohio State University. Myers has been with Eljer since 1940. Witzemann has just returned to the company from the Navy.

Said an Eljer executive, " . . . this is a sign that we are not allergic to new blood and new ideas."

### Final washer-ironer sales figures for 1946

Factory sales of household washers in 1946 broke all records, totalling 2,023,981, after a slow start in converting from war manufacturing, compared to 1,959,887 in 1941, final prewar year of full production, according to figures announced by the American Washer and Ironer Manufacturers' Association.

Ironer sales were 124,616, compared to 215,994 in 1941.

December washer sales were third highest of any month in 1946, aggregating 190,770, or 68 per cent above 113,054 in December, 1941. Ironer sales in December topped the 1941 comparison month by 18 per cent, totalling 15,469.

### Summer market dates

Summer Market at American Furniture Mart, Chicago, is scheduled for July 7-19, 1947. Buyers are being urged to make hotel reservations early because of an unusually heavy demand for accommodations.

### Industrial conference

The A. G. A. sales conference on industrial and commercial gas, sponsored by the Industrial and Commercial Gas section, American Gas Association, will be held at the Copley Plaza Hotel, Boston, March 17, 18 and 19, 1947, according to an announcement by Karl Emmerling, chairman, Industrial and Commercial Gas section.

### Affiliated manufacturing companies department established by G.E.

The General Electric Company has established an Affiliated Manufacturing Companies Department, and appointed Vice President L. R. Boulware as general manager, President Charles E. Wilson has announced. E. J. Harrington has been appointed manufacturing manager of the new department, and Roy W. Johnson marketing manager.

The manufacturing affiliates include Carboloy Co., Inc., General Electric X-Ray Corp., Hotpoint, Inc., Locke Insulator Corp., The Monowatt Electric Corp., Telechron Inc., and the Trumbull Electric Mfg. Co.

### Over 87,000 DuPont stockholders

E. I. du Pont de Nemours & Company, Inc., was owned by 87,619 holders of common and preferred stock as of December 31, 1946, the company reports.

Every state in the union is represented among Du Pont shareholders, the company said. Approximately 37,000 are women.

### Pizor advanced at Norge

R. H. Pizor, formerly manager of laundry equipment sales, the Norge division of Borg-Warner Corp., has been appointed sales manager, eastern region, effective March 1, with headquarters in New York, it was announced by M. G. O'Harra, Norge vice-president.

Pizor joined the firm in 1934 and is the third oldest man in the Norge sales department from the standpoint of service.

Pizor's successor, as laundry equipment sales manager, has not been announced.

Ritner W. Tomlinson has been appointed superintendent of the Easton,

Pa., plant of the Pennsylvania Salt Manufacturing Company, Claude S. Beldin, Pennsalt production manager, announced. Tomlinson previously was plant superintendent of the company's plant at Cornwells Heights, Pa., and the Greenwich plant in Philadelphia.

### O. Hommel appoints new west coast representative

Mr. Norman D. Slevin is the new sales and service representative of the O. Hommel Company on the west coast, according to a recent announcement by Ernest Hommel, company president.

Slevin's first association in the enameling field was with the American Stove Company of Cleveland, Ohio, until 1927 when he moved to the West Coast to work with the James Graham Manufacturing Company and later, the Ferro Enameling Company of Oakland, California. These connections cover a span of 25 years.

During World War II Slevin was field purchasing agent on a project in Alaska. After the war he returned to the James Graham Manufacturing Company and remained there until his recent association with O. Hommel.

### New Philco P.A. for refrigerator division

Appointment of William Chaffee as purchasing agent of the Refrigerator Division of Philco Corporation was announced recently by William MacMurtrie, general purchasing agent.

At the same time, George Hulse was named assistant to the general purchasing agent.

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Stockholders of the Conlon Corporation, Chicago, and of the Moore Corporation, Joliet, Ill., were to vote February 26 on a proposal, approved by the directors of the concerns, to merge Conlon into Moore, the surviving company to be known as the Conlon-Moore Corporation. The Conlon Corporation bought the controlling stock interest in Moore in December, 1945. Assets of the new corporation will be in excess of $3,000,000.

"Present operations and management in Chicago and Joliet will continue undisturbed," Bernard J. Hank, president of both companies, stated.

### Electrical Household Utilities advances three men

Three new advancements of key personnel were announced by E. N. Hurley, chairman of the board, Electric Household Utilities Corporation.

Walter F. Oberst, formerly vice president of the Meadows Division, Bloomington, Illinois, has been appointed president of that division.

Owen G. Nugent has been advanced to the post of vice president in charge of manufacturing. Nugent was formerly eastern division manager.

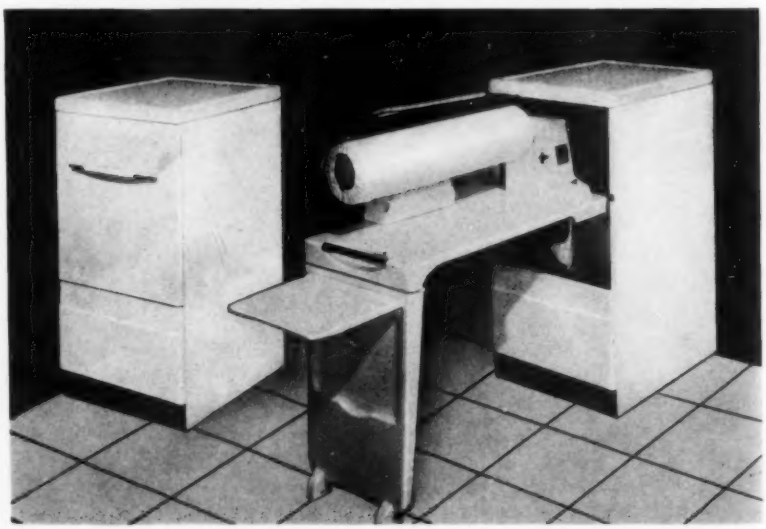
A. R. Nickson, who has been with the company since 1916, has been

*vice president-manufacturing*

appointed vice president in charge of plant engineering for all company plants.

In addition to home offices and the plant of the Hurley Machine Division in Chicago, the company now operates plants in Bloomington, Illinois; El Monte, California; Toronto, Canada, and London, England.

### Fold-a-matic ironer has porcelain enameled top



A new domestic ironer of entirely new design is being introduced to distributors and dealers of the Apex Electrical Manufacturing Company, of Cleveland. It will replace the conventional cabinet-type ironer in the Apex line.

In addition to many improvements

# *Complete, High Production*
# PORCELAIN ENAMEL FINISHING SYSTEMS

Engineering, fabrication and installation by one organization is the key to dependable performance and complete satisfaction. GEORGE KOCH SONS offers you this complete service, backed by many years of experience and an extensive record of past installations.

Competent, experienced engineers handle your job from initial planning to final installation. Every available inch of floor space is utilized without crowding. Conveyorized units are often designed with overhead ovens to conserve valuable floor space. Occasionally the entire installation is overhead. In operation, efficient KOCH Porcelain Enamel Finishing Systems will show greatly increased production and lower operating costs.

KOCH will design, build and install the complete system. There is only ONE responsibility.

•

The Brown Stove Porcelain Enameling plant layout featured in the January issue of this publication was handled by KOCH Engineers and the installation, with the exception of the spray booths and the high temperature furnace, was supplied by KOCH.

## GEORGE KOCH SONS, INC.

## KOCH
## INDUSTRIAL EQUIPMENT
EVANSVILLE, INDIANA, U. S. A.

*Sales offices in leading industrial centers:*

NEW YORK
William Printz Co.
358 Fifth Ave.

CHICAGO
George Koch Sons, Inc.
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LOS ANGELES
Industrial Systems Co.
341 S. Central Ave.

in technical and operating features, the ironer introduces a new design principle which enables the roll, shoe and other operating parts to be "folded away" in a vertical position in the ironer cabinet when not in use.

The cabinet top offers convenient work space when it is closed and also during ironing operations. It is finished in porcelain enamel. The cabinet was styled by Dave Chapman, noted Chicago industrial designer.

## Electromaster moves to new Mount Clemens plant

*R. B. Marshall, president, Electromaster, Inc., greets his executive staff at the recent opening of the company's new offices. Left to right: R. B. Marshall, Gerald Hulett, J. A. Bell, R. B. Blanchard, E. R. Genthe, H. H. Hubbard, C. A. Jakeway, D. W. Scofield, W. F. Ouderkirk, E. A. Gartha, E. C. Seabright, H. H. Munro and R. J. Megargle.*

Electromaster, Inc., moved its entire operations from Detroit into the firm's new three-quarter million dollar plant in Mount Clemens, it is announced by R. B. Marshall.

Since last July, when the center section of the new plant was completed, the company's range assembly lines, porcelain enameling and shipping divisions have been in operation in Mount Clemens. A fleet of trucks has kept the steel stampings, used in range construction, rolling across the twenty miles from the firm's old Detroit location to the new plant.

"We are particularly proud of our new factory because it is the goal to which we have been striving for many years," said Mr. Marshall. "Also the latest facilities of our new plant, with its modern production facilities, including automatic porcelain enamel sprayer; the complete handling of parts by conveyors; and the second longest U-type continuous furnace in the industry; will enable us to more than double our production of ranges and water heaters."

## Production show and conference March 17, 18, and 19

The Chicago Production Conference will be held March 17, 18 and 19 in the Stevens Hotel concurrently with the Chicago Production Show. Both are sponsored by the Chicago Technical Societies Council.

In 35 conference sessions, technical societies affiliated with the council will play host to more than 2,000 middle west production executives interested in the conference theme of "production for profit." Covering virtually every phase of the production cycle, the conference will be a three-day "short course" in advanced production-lines and general management techniques.

Subjects to be covered during the 35 sessions are Applied Research; Modern Management; The Average Worker; Designing the Modern Factory; New Uses and Sources of Power and Heat; Practical Production Control; Relation of the Lab to Production; New Non-Metallic Materials: Metals, Top Production Material; Foundry, Forge and Rolling Mill; Welding, Brazing and Soldering; Forming, Spinning and Extruding; Machining, Jigs and Fixtures; Platings and Finishes; Packaging and Containers; and Instrumentation and Controls.

The Production Show, with an estimated attendance of 20,000 production men, will present to conference participants exhibits by 130 manufacturers.

## Lew Adams gets new assignment at Chicago Vitreous

L. A. (Lew) Adams, who has been district manager, Southern Territory, for Chicago Vit since 1932, has just been appointed assistant manager, sales and service. In his new capacity he will make his headquarters in Chicago where he will work with F. L. Meacham, manager of sales and service, and A. S. Ault, assistant manager, sales and service.

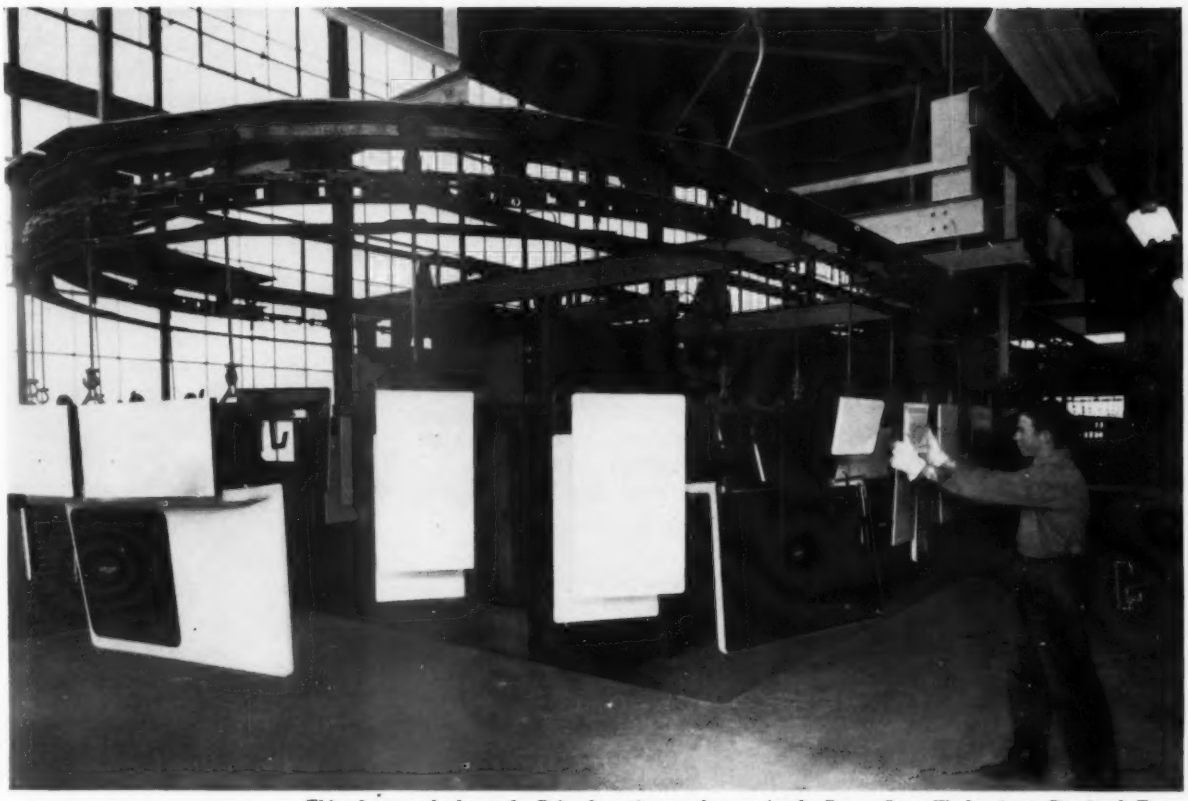
Lew is an old timer in porcelain enameling, having been active in the industry since 1920, when he started with Mansfield Vitreous, Mansfield, Ohio. He joined Chicago Vit in 1929, as Eastern District manager — followed this with two years in the Chicago office — and has headquartered in St. Louis since then.

## ICHAM Oil Division technical committee appointments

A. T. Atwill, Quaker Manufacturing Company, recently reelected chairman of the Oil Division, Institute of Cooking and Heating Appliance Manufacturers, has announced the reappointment of the division's seventeen-man technical committee for 1947.

The technical committee is headed by Dean Olds, The Coleman Company, Wichita, Kansas. In addition to Mr. Olds as chairman, members reappointed include engineers and sales officials of leading producers in the industry. They are:

Neil H. Cargile, Allen Manufacturing Company, Inc., Nashville, Tenn.; Eugene Ferrell, Norge Division, Borg-Warner Corporation, Detroit; S. J.



*This photograph shows the Boland continuous furnace in the Brown Stove Works plant, Cleveland, Tenn.*

# BOLAND "SINGLE FLOW" FURNACES

## Mean Maximum Production at Low Cost

**Boland SINGLE FLOW furnaces are going into many of the new high production plants because the history of Boland furnaces is one of maximum production at low operating cost.**

**The Boland STRAIGHT AWAY furnace has unobstructed radiating surfaces on both sides of the ware, plus a pre-heat zone that controls temperature rise.**

**Only Boland furnaces have patented FLOATING ROOF construction. This roof, "built like Gibraltar," aids in minimizing heat loss and is your best insurance against conveyor distortion.**

**When you buy Boland furnaces you get STURDY construction and a number of important features available in no other furnace. To you these features are translated into speedy production (heavier furnace loads) and quality ware (equalized temperature) — at cost figures of interest to every production-minded plant man.**

---

## ALBERT J. BOLAND COMPANY

**407 NORTH EIGHTH BUILDING • ST. LOUIS 1, MO.**

***Designers and Builders of Continuous and Box Type Enameling Furnaces***

Heiman, International Oil Burner Company, St. Louis; J. C. Hemingway, H. C. Little Burner Company, San Rafael, Calif.; Kenneth Jenfon, Prentiss-Wabers Products Company, Wisconsin Rapids, Wis.; R. W. Johnson, Automatic Products Company, Milwaukee; D. F. Jones, Duo-Therm Division, Motor Wheel Corporation, Lansing, Mich.; J. B. Mathis, Quaker Manufacturing Company, Chicago; Marc Resek, Perfection Stove Company, Cleveland, Ohio; Stanley Perry, Oil Devices, Chicago; R. N. St. John, The Coleman Company, Wichita, Kans.; Frank H. Schneider, Florence Stove Company, Gardner, Mass.; George M. Schueder, Evans Products Company, Detroit; T. M. Sourbeck, American Stove Company, Lorain, O.; Kirby Walker, American Gas Machine Company, Albert Lea, Minn.; and J. H. Witte, Underwriters' Laboratories, Chicago.

### Foote Mineral affiliate in Brazil

Foote Mineral Company, Philadelphia, announces the affiliation of Foote Minerios Industrializados, Ltd., Brazil (trade name, Fomil). Foote Minerios maintains offices at both Rio and Victoria and operates as a mining company and ore buyer.

### Jaros represents Master Builders

Wm. G. (Bill) Jaros, formerly sales representative for Porcelain Products Company, an affiliate of Chicago Vitreous Enamel Product Co., has changed positions. He is now representing The Master Builders Company, of Cleveland, Ohio, in the Chicago area, with offices in the Builders Building. Bill formerly was in close contact with large users of architectural porcelain enamel.

### George Sirovy, III

Congratulations are in order for George Sirovy and George Sirovy, Jr., of Century Vitreous Enamel, on the arrival of George Sirovy, III. The young man weighed in at 6 lb., 8 oz., on February 13. George, Jr., is sales manager at Century Vitreous.

This is the second time within six months that George, Sr., became a grandpapa, as a baby girl arrived at the home of another son, Harry, in September.

### New Pemco vice president

According to an announcement made by Karl Turk, Sr., president of Pemco Corporation, Dr. George H. Spencer-Strong, research director of the company since 1942, has been elected a vice president. In 1928 Dr. Strong received his Bachelor of Ceramic Engineering degree from Ohio State University. Two years later, in 1930, he received his M.S. from the same school; in 1934, his Ph.D.; and in 1941, his Cer.E. In 1934 he accepted a job with the Pemco Corporation in their laboratories and was advanced in 1936 to the post of assistant director of research. In 1942 he was appointed director of research, the position which he will continue to hold in addition to his new activities as vice president.

Dr. Strong is a registered engineer of Maryland, a member and fellow of the American Ceramic Society, and a member of the Institute of Ceramic Engineers and the American Society of Metals. He has served on numerous committees in the American Ceramic Society and the Enamel Division of the Society. In 1939 he served as chairman of the Enamel Division, and that same year was chairman of the Baltimore-Washington Section of A.C.S. From 1937 to

*to Page 48* →

*"I don't care what you think, we* still *don't have TITANIUM!"*

# WHAT MAKES McDANEL GRINDING BALLS so outstanding in performance?

## Mill Testing and Rigid inspection Eliminate all but the Best

Throughout their manufacture, McDanel Grinding Balls are carefully inspected to maintain the high standards of quality and service for which all McDanel products are known.

Before shipment each and every McDanel Grinding Ball is run in an uncharged mill and time-tested for its ability to withstand abrasion under severe conditions.

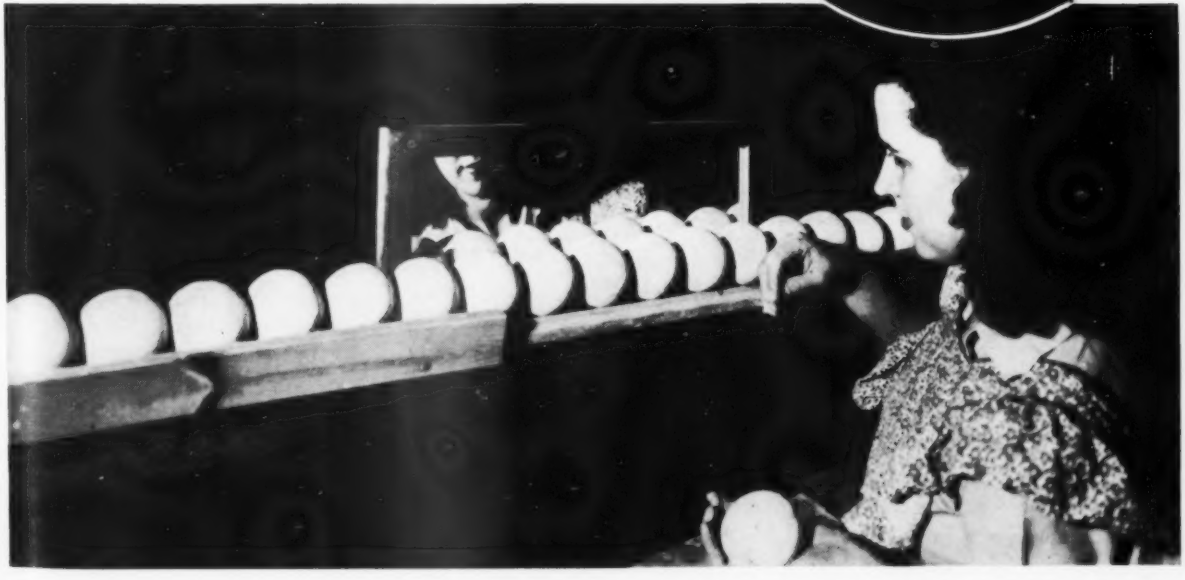
Their final inspection eliminates any ball that shows the least imperfection.

Thus McDanel Grinding Balls come to you pre-tested, individually inspected and ready to give outstanding performance in your grinding operations.

**CHICAGO VITREOUS ENAMEL PRODUCT COMPANY**
**EXCLUSIVE REPRESENTATIVES FOR THE ENAMELING INDUSTRY**

MILL HEAD ASSEMBLIES . . . DOOR LINING BLOCKS
STANDARD MILL LINING BRICKS . . . SPECIAL MILL LINING SHAPES
PORCELAIN GRINDING JARS and JAR MILLS
METAL COVERED GRINDING JARS and JAR MILLS

**McDANEL REFRACTORY PORCELAIN CO.**
BEAVER FALLS, PENNSYLVANIA



1945 he was a member of the Products Standards Committee of the Porcelain Enamel Institute, and was appointed to the chairmanship of this committee in 1945, a position which he now holds. He is also a member of other PEI committees.

In addition to his activities with the various organizations in the enamel and ceramic fields, Dr. Strong has written and had published numerous articles, books, papers, etc., on related subjects.

### Steel for appliance production

The recent high level steel production will soon be reflected in a greater flow of heavy porcelain enameled goods such as major appliances and architectural panels, Edward Mackasek, managing director of the Porcelain Enamel Institute, told the Institute Market Development Committee during its recent meeting in Pittsburgh.

According to reliable authorities, steel ingot production in Pittsburgh is averaging 92 to 95 per cent of rated capacity, while production over the country as a whole has climbed to between 97 and 103 per cent.

With reconversion in the porcelain enameling industry generally completed, said Mr. Mackasek, the only deterrent to record output in the past has been raw material shortages. Heavy porcelain enameled goods for the architectural, chemical, and food storage and processing industries, and for major household appliances, is mainly dependent upon current enameling iron and steel sheet supply. Improvement in availability of these steel products, while being shared by the enormous demands of other industries, will be sufficient to give the porcelain enameling industry another bright upturn.

### Lodestro with Crown Stove

The report comes to *finish* that Leonard Lodestro, formerly associated with Lawndale Enameling, is now foreman of the enameling plant at Crown Stove Works, Chicago.

### OSU engineering division to work with Ohio Industrial Commission

The Ohio State University industrial engineering department has established a new cooperative program with the Ohio Industrial Commission which calls for three commission members to lecture without pay at Ohio State, consult with students on engineering problems and help map a safety engineering research program.

Both the commission and the university board of trustees have authorized the arrangement which will have the three board members lecturing in their respective fields in the safety engineering curriculum.

Commission members who will be on the campus are Lester M. Merritt, a cer. engr., Walter E. Obetz, M.D., and Rufus Shockey, an attorney.

Merritt, who was graduated from Ohio State in 1918 and obtained the degree of ceramic engineer at OSU in 1938, has been on the staff of the Ohio Industrial Commission since 1939. He is an authority in the field of dust hazards in industry.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**Available from stock. Also complete line of chemicals for Ceramic and Plating Industries. Write, wire or phone CHerry 0296.**

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# Here's Everything you want in an Enameling Iron!

● Here's real drawing quality. Republic Toncan Enameling Iron takes deepest draws of tubs and similar items without difficulty. The metal flows freely into corners without cracking or wrinkling.

Here's non-sagging quality. When processed for use in table tops, signs and other large panel sections, Toncan Enameling Iron ends warping, twisting and sagging troubles. Panels retain their original shape—simplify assembly—cut costs.

Here's a combination of deep drawing and non-sagging qualities, too—for products like the range parts shown above, which require both.

Yes, here's everything you want in an enameling iron—including uniform weldability and an affinity for vitreous porcelain enamel that insures continuous production of smooth, flaw-free surfaces.

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**Other Republic Products include Carbon, Alloy and Stainless Steels—Pipe, Sheets, Strip, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing**

## Chicago enamelers club

→ *from Page 34*

limits *before rejects are produced.* This contrasts with much inspection work, which is "post mortem." The plant man will visualize the advantages of predicting trouble and bad work *before* it becomes scrap.

The broad aspects of the system are of interest because under the statistical method of quality control, the *system* is controlled and not the individual piece. Mr. Jones showed clearly how such methods can be used in the enameling plant for the control of thickness, for the control of dipping weights, spray weights, and various operations where the maintenance of tolerances are important to the finished product.

In conclusion, he showed how a breakdown of final charts from the system are prepared for management and shop supervision as a current guide.

### Man-to-man management

Ken Wells, manager, Organization Development, Chicago Area, National Association of Foremen, gave an inspiring talk on "Humanics" in industry and some of the labor relations problems that management is facing. He reviewed the curve of top attention which is traceable in industry from problems of production to problems of selling (in the '20s) to those of engineering "know-how," and named as the No. 1 essential for today and the future — "satisfactory human relationships." Said Mr. Wells, "Eighty-five per cent of all the problems of industry are human problems. We are spending most of our industrial money where it is affected by human relationships, without proper consideration for the relationships themselves. There has been constant deterioration with regard to the *individual.*"

Truly big men, Mr. Wells believes, are big men *inside* — and interested deeply in the people. He believes there is real gain to be obtained through an exchange of ideas in human relations between companys and industries in the same manner that technical improvements have been exchanged. The necessity of buying new and increasingly efficient equipment that is capable of showing savings or greater production is conceded, but more thought must be given to successful methods for getting top efficiency from the individual worker. To do this, Mr. Wells believes every man in industry must strive to again learn to talk "man to man." He further feels that the field of "humanics" is in a similar stage of development as aerodynamics at the time of the Wright Brothers' first flight. Knowledge of human affairs is a tremendous untapped resource.

### Charles Pearce attends meeting

C. S. Pearce, general secretary of the American Ceramic Society, was in attendance at the Chicago meeting with a personal invitation to all enamelers to attend the annual ACS convention scheduled for the week of April 21, at Atlantic City.

## Eastern Enamelers Club

On Saturday, February 15, 108 members and guests of the Eastern Enamelers Club met at the Ritz-Carlton Hotel in Philadelphia, Pennsylvania, to hold their third and largest meeting of the season.

Club president, Nathan Klein, Caloric Stove Corp., disposed of principal business matters, and then introduced Floyd Woleslagle, Market Development Division of Carnegie-Illinois Steel Corp., who presented a pictorial slide film entitled "Porcelain Enamel Preferred" *(See "A Slide Film Presentation of Research Data on Porcelain Enamel Preferences," December, 1946, finish)*, representing the public's opinion about porcelain enamel which was obtained from three surveys conducted by the Market Development Committee of the Porcelain Enamel Institute.

The survey was divided into two parts: One obtained the ultimate consumer's preference for finishes in kitchen equipment; the other revealed the architects' and product designers' opinions about the application of porcelain enamel. The slide film, a tabulation of their answers, disclosed that porcelain enamel carried a high rating for the type of finish that is preferred by the consumer and the designer.

### "Cartoon Quiz" used for audience participation

As an added feature of the slide film presentation, a "Cartoon Quiz" sheet was distributed among the audience to give them an opportunity to participate in the speaker's program. The audience was called upon to guess what percentage of the public preferred porcelain enamel finishes for various kitchen equipment and then to check their answers with those given by the final buyer of kitchen equipment.

The survey, in general, testified that porcelain enamel was winning new friends and that the advertising programs were influencing people up and down the production line of the manufacturer and builder.

### Reduction of field losses is the feature topic

The feature speaker on the program was Ralph F. Bisbee, manager of quality control, Westinghouse Electric Corp., who gave an illustrated talk on the "Reduction of Shipping and Field Losses . . . " Bisbee emphasized five points which he described as being the five links of the magic chain which forms the unity necessary for the reduction of shipping and field losses due to *fractures and mechanical damage.* The five points making up the magic chain were: Design, enamel process and process controls, packaging and crating, handling and loading, and transportation. He pointed out that the proper attention to all of these, plus careful standardization, would greatly reduce losses throughout the entire manufacturing assembly, in transportation, and in final use.

The compilation of facts which was used for the background of Bisbee's talk was the actual compilation gathered by him for Westinghouse from the time that company resumed peacetime manufacturing of electrical and other appliances several months after V-J Day up until the present time, a research program which he states is still being carried on by the company.

*to Page 62* →

THE NEW

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TITE-WITE the NEW porcelain enamel
The lightweight finish that's tough

Try Tite-Wite, regardless of the finish you are now using. Tite-Wite is the porcelain enamel that will open the door to many new fields. Tite-Wite is THE finish to use. There is only one TITE-WITE.

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- ★ Reduced black edging problem
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- ★ Better scratch resistance
- ★ Improved thermal shock resistance

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Experienced plant operators, with both technical and practical enameling experience, are the answer to dependability. Owner-operators with 44 years combined experience are at your service.

Lifetime porcelain enamel may be the answer to your metal product finish problem. Just give us a ring and we'll gladly advise with you, without obligation, on your finishing requirements.

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Today, no enameling plant need sacrifice the benefits of dip tank circulation. Pumping is no longer a *problem.* The amazing R & M Moyno has licked this job, completely.

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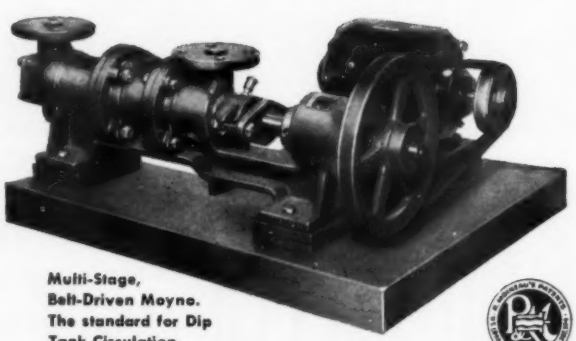
The Moyno has no cylinders to score; no valves to stick; no flow obstructions which require destructive high internal velocities and turbulence. Moyno's patented pumping principle of *ever-changing* seal lines resists abrasives and chemicals, passes particles, *stands up* where other pumps fail. The simple rotor-stator pumping element does all the work, takes all the wear. No body casting has ever worn out.

### NEW BOOK YOURS FREE

There's nothing like the Moyno for "impossible" conditions of abrasion, viscosity, and suspended solids. It's self-priming, reversible; delivers positive pressures without pulsation—does *everything* well. Types for every purpose. New book, "A Turn for the Better," gives capacities, pressures, dimensions, uses. We'll be glad to mail your copy.

### •••THE PUMP THAT STANDS UP ON ABRASIVES

**NO PISTONS • NO VALVES**
**NO HIGH-SPEED IMPELLER**



Multi-Stage, Belt-Driven Moyno. The standard for Dip Tank Circulation.

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## The production of glass lined water heaters

*(Continued from Page 18)*

Smith-designed machine which will not only electrically test the interiors of the tanks but, in the event of any flaw, will automatically stamp the outside of the tank at the point of failure.

Following unloading of the application conveyor fixtures, they travel through a spray wash for thorough cleaning. Hot water is used here so that the fixtures are self-dried.

### Completing fabrication and assembly

The glass-coated tank components then leave the ceramic finishing department in complete sets on the overhead bank and service conveyor previously described, and travel to the welding section where fabrication is completed, and the tanks pressure tested. This completes the manufacture of the glass lined tank. It then continues down a conveyor line to join with insulation, outside shell, controls and other parts which complete the finished water heater.

### Material and process control laboratories

A complete laboratory for control of the materials and processes used in manufacturing throughout the plant consists of three integrated units. In one area is a complete chemical laboratory where any type of chemical analysis of materials can be made, as well as microscopic examination. Included, also, is equipment for testing physical characteristics of steel.

In an adjacent enclosed area are full facilities for thorough checking and testing of bonderized, painted, and galvanized finishes. This includes such equipment as water wash spray booth, electric baking oven, constant humidity cabinet, salt spray cabinet, Taber Abrader, and many other instruments and equipment needed for thorough checking of such finishes.

The area for checking and control of the glass coating is separated from the other two areas. It contains a ball mill rack for grinding small laboratory batches of frit, torsion balances, rotap, electric thickness gage, water wash spray booth, and an electric furnace with recording temperature controller and facilities to use "controlled atmosphere" piped over from the atmosphere producer at the manufacturing furnaces. Adjacent to this furnace is a cooling unit for fired samples, and is enclosed in the same hood as an adjustable infra-red electric drying unit. A fan draws outside air down underneath these two units and then returns it to the outside.

### A 378,000 square foot plant

Production lay-out is designed so that all steel to be fabricated enters the north end of the 1200 foot long by 315 foot wide plant and feeds through consecutive operations to the final assembly lines and shipping at the south end. In full production, the plant will produce more than 1,000 water heaters a day, representing the daily production and assembly of some 150,000 different parts.

### Modern plant innovations

One interesting feature of the plant is its heating system. It employs radiant heat which emanates from over 300,000 feet of piping embedded in the concrete floor. Hot water is the medium, and the source is 120 small gas water heater units mounted near the ceiling along the center aisle of the plant. This is the largest radiant heating system in the world. The same heating system is also used for the offices, engineering, and laboratory rooms in the two story sections of the plant, except that part of the piping is installed in the ceilings instead of the floor.

Engineered color schemes used throughout the plant have proved interesting to most visitors. The general overall color scheme consists of two shades of green. All equipment, and walls below a point approximately 5′ 6″ above the floor line, are painted a medium green; while the walls and ceiling above this line are painted light green. Moving parts on presses and other equipment are bright yellow. All equipment controls are a bright orange. All piping in the plant is painted in accordance with a definite plan, such as red for the sprinkler system and other contrasting colors for water, steam, gas, etc.

Fluorescent lighting is used throughout the plant, with the light intensity installed in each production area according to the demands of the operations involved.

It is interesting, too, that there is no power plant as such, since the plant heating source is from water heaters, as well as for processing operations requiring hot water. Three gas fired 150 H. P. steam boilers furnish the steam required for bonderizing in the painting department and the cleaning operations in the galvanizing department.

As has been indicated, natural gas is used throughout the plant with an adequate butane stand-by installation. Thus, with a butane air mixing unit, the transfer from one fuel to the other can be made in a short time.

Another innovation which usually catches the attention of our plant visitors is the use of motor scooters which are employed to shorten the time requirements for our engineers, control men, etc. who must frequently visit "remote" sections of the plant.

### Various bank and service conveyors serve entire plant

A separate bank and service monorail conveyor for each ceramic finishing unit carries the glass coated parts down the plant to a point where they are welded into complete units. Each conveyor is over 1200 feet in length and is designed to hold the total daily output of a glass coating unit.

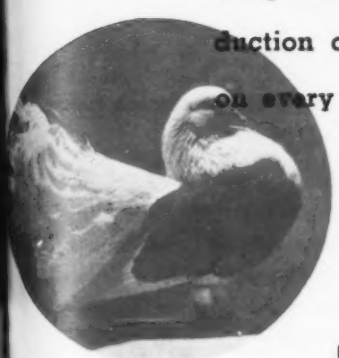
Three other monorail conveyors carry parts from the conveyorized bonderizing and painting section for outer heater parts, and then pick up the remaining component parts from stock rooms along the southwest side of the plant. These same conveyors finally deliver, in the proper order, complete sets of parts for final assembly on six separate slat type conveyors. Roller conveyors then take the finished heaters from these final assembly lines through crating to deliver them at rail and truck docks.

# THE IMPORTANCE OF L

# FLOOKING IMPORTANT

IN A LOFT of a hundred birds your attention is suddenly attracted to one . . . a little pouter with feathers fluffed and tail fanned . . . it seems to know the "importance of looking important." And how closely this parallels your efforts in the production of your products; how important it is to you that on the sales floor the finish of your product carries that important look . . . one standing out from among many with clarity and a definite appeal of beauty. Yes, that "important look" is necessary to lift your product out of the rut of the commonplace to something with an intangible appeal . . . character!

Pemco offers for the accomplishment of this ideal the World's Only Wholly Continuous Smelted Frits . . . time tested . . . production controlled . . . to assure uniform performance every day on every production run.



*It will be a pleasure for a Pemco Representative to discuss this with you.*

## PEMCO CORPORATION

BALTIMORE MARYLAND

*"ALWAYS BEGIN WITH A GOOD FINISH"*

## The properties of porcelain enamel and their effect upon enamelware

*(Continued from Page 24)*

ance. This was done merely as a start for impact data. A review of the results in Table V did not reveal any indication towards a correlation of this property and cover coat expansion, but a definite relationship appears to exist between impact resistance and thickness of coating. This comparison is shown graphically in Figure VI. Considering that these results were from only one sample and that four enamels of quite different properties and their various combinations were used, it is quite remarkable to observe the trend of increased impact resistance with increased thickness of coating.

### 2. Ground coat expansion

Using the chosen cover coat combination of C1 over C3, the effect of ground coat expansion was studied by making sample lots 14 to 17. The compositions of these ground coats were varied as shown in Table II to give a range of expansion. Such changes were accompanied by some change in fusibility. Hence, the proper firing treatment for each frit was checked on separate plaques, Table III, and the pans were then fired at what appeared to be the most suitable temperature. In order to keep other variables at a minimum, subsequent cover coat firings were made at the same time and temperature that had been chosen for the particular ground coat.

### Thermal shock

These results are tabulated in Table VI and shown graphically in Figure VII. Any variation in thickness has been momentarily disregarded and will be considered more extensively in a later series. The data shown in this manner indicates that thermal shock resistance increases with increases in ground coat expansion.

**Editor's Note:**

**The comprehensive nature of this research, which is being presented exclusively in the ceramic finishing industry by *finish*, makes it necessary that we present it in three parts.**

**Part I in this issue, including Sections I and II, will be followed by two additional parts in consecutive months. We urge that all finish readers interested in the technical aspects of this work, and who do not file *finish* regularly, clip this series of articles as they appear. You will find references in later sections to charts and tables presented in the earlier sections, and clipping or filing of the complete presentation will make these references readily available.**

### Impact

Observing the impact results obtained on this series, Table VI, a trend towards decreased impact resistance with increased expansion might be indicated if no consideration were made of thickness in each case. A study of the combined effect of these factors will be made in a series consisting of Lots 26 to 29.

## The value of visual aptitude tests

*(Continued from Page 28)*

through years of testing and correlation of test data upon many thousands of employees. To make the most effective use of the test material that had been worked out, a new instrument called the occupational visual survey telebinocular was developed.

With this new instrument it is possible for an operator to conduct the testing of as many as 100 employees in a single eight hour day without undue fatigue, and without reducing the value of the data obtained by shortcutting the tests. The subject sits before the machine, which is then adjusted to his eye height by moving the counter-balanced head up or down. The instrument is held at the proper angle by a concealed parallelogram as this adjustment is made. The top magazine of cards is for testing the subject's vision at "far points"; that is, when his eyes are focused substantially for infinity. Since these tests are designed to check the employee's visual ability at his work, the tests are conducted with glasses on — if the employee already wears glasses.

With the machine set for "far point" vision, tests are made of the vertical alignment of the eye (vertical phoria), acuity of each eye, stereopsis, horizontal alignment (lateral imbalance), and color perception. By turning the knob on the side of the machine, the optical system, which has fully corrected anistigmatic lenses, is lowered to a normal reading angle for use of the reading distance of "near point" magazine of test cards with which acuity of the two eyes is again tested and lateral imbalance for reading distance is checked. These results are recorded on a scoring chart from which an accurate inventory of the employee's visual ability is immediately apparent by scanning the scoring chart through a transparent scoring matrix.

With this visual ability record in hand, the personnel department knows whether the employee's, or prospective employee's, vision is equal to the task to which he is to be assigned. If it is not, he or she may be directed to an eye specialist who may be able to give him suitable glasses or corrective training.

For large plants, where it is desirable to do careful statistical studies of the visual requirements of each type of job and the success at each job type with employees of various visual abilities, optional statistical services are available through independent organizations.

### The results of widely used visual ability data

*(a) More efficient production of a better quality product.*

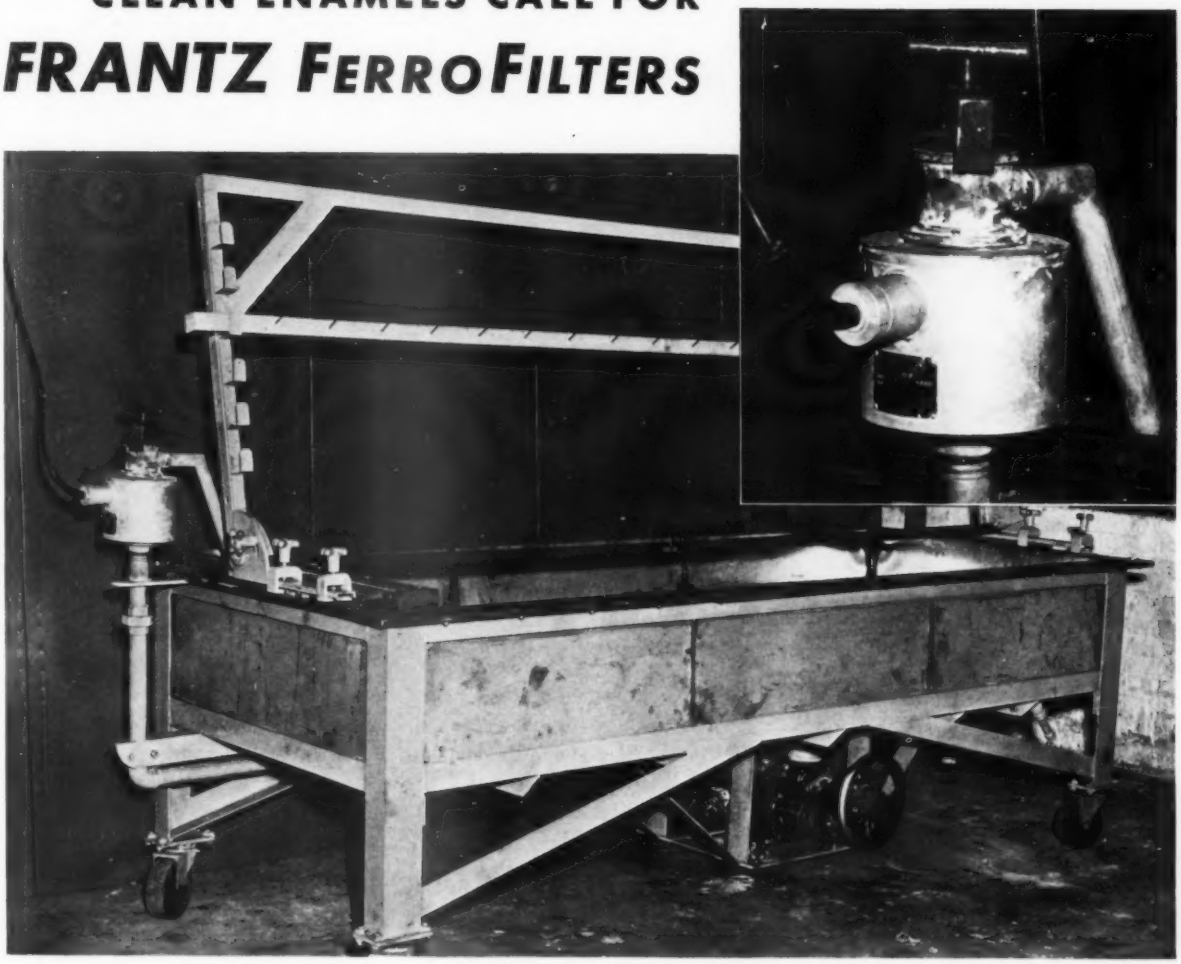
*(b) Placement of men with defective vision in jobs where these deficiencies will not interfere with their work.*

*(c) Employee satisfaction from working without eye strain at a job within the range of his or her visual ability.*

*(d) Reduction of labor turnover resulting from the employee finding*

# TROUBLE-FREE PRODUCTION CALLS FOR
# *CLEAN ENAMELS*

## CLEAN ENAMELS CALL FOR
## *FRANTZ FERROFILTERS*



A pipeline-type Frantz FerroFilter installed on a new circulating ground coat dip tank at CROWN STOVE WORKS, Chicago, Illinois.

Whether your need is for a pipeline-type FerroFilter for use on a circulating ground coat dip tank, or a gravity-type FerroFilter for general millroom use, you can be sure that contaminating iron particles are removed from your milled enamel if you select Frantz FerroFilters for the job. The pipeline-type Frantz FerroFilter is made to fit 1-inch, 1½-inch, 2-inch and 3-inch standard pipe sizes. The new design of cover fastening makes it possible to open this pipeline-type for cleaning in just a few seconds. The gravity-type Frantz FerroFilter is available in four different sizes. To be sure your enamels are really clean install Frantz FerroFilters.

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*Exclusive Sales Representatives for the Porcelain Enamel Industry*

## S. G. FRANTZ CO., Inc.

161 GRAND STREET
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*himself uncomfortable at work.*

*(e) Prevention of seeing accidents which not only result in lost time and employee distress, but may result in serious mechanical breakdown and lost production time of the plant.*

*(f) Knowledge of which employees warrant expensive training procedures for specialized skilled work.*

More and more employers are coming to realize the vital necessity of efficient, effective, as well as speedy appraisals of the aptitudes of potential employees. These tests are important from the standpoint, not only of product *quality* and production efficiency, but also from that of plant *safety*.

And last, but not least, is the impression that the tests make upon the employee. His interest is brought to bear on his eyes and he is made aware of the importance of eye protection and visual hygiene. If he has vision defects — many people do see only with one eye for years, without being conscious of suppressing the vision of a defective eye — this is brought to his attention and he is encouraged to see his eye specialist.

Some estimates indicate that as high as one third of industrial employees have correctible eye defects, and testing programs such as that made possible by this system will be of great service both to labor and management in finding these defects and making employees aware of them.

It will be realized that in our highly technical age, when men as well as machines must be able to function with speed, skill and safety, tests for the processes of (a) rechecking (b) pre-employment (c) pre-placements and (d) visual record making, are of great importance. Any such plan must, of course, be carefully explained to the employees and to prospective employees, and there must be a permanent rating card record, with parallel job standards requirements, of which they are corollary.

## A new canadian enameling plant for sanitary ware and jobbing

*(Continued from Page 27)*

elevator tray and 2 on top elevator tray, on each side of dryer. Therefore, we have the elevator which can be moved up or down to suit position required to put in or take out baths. The advantage of this dryer is the space saved.

### Electric furnaces used

The furnaces consist of one 5′ x 13′, 300 KW, 2-zone electric furnace and one 5′ x 8′ furnace of the same type, so designed that it can be extended at a future date to duplicate the larger installation. The smaller furnace has, at present, a connected load of 200 KW.

In the larger furnace, bathtubs are fired two to a load in tandem, plus two flat rim kitchen sinks. The smaller furnace takes a load of one bath and four sinks. As all enamelers will recognize, the design of burning tools or fixtures is extremely important to the firing of products of this size. The tools used are comparatively light in cross section, thus avoiding the addition of too much weight to the firing load. They are so constructed that they give adequate support to all sections of the tub, particularly the overhanging flanges.

### Control laboratory

Our laboratory consists of a miniature enamel plant. It houses our Rotap machine for testing milling fineness, electric dryer used both for drying residue as well as any dipped or sprayed parts processed or tested there, full titration set-up for our pickling system, series of 1000-gram frit mills, small spray booth, and small electric furnace, electric thickness guage, work tables *(all covered with porcelain enamel)* and all necessary scales for weighing.

Our baths and sinks are tested daily for acid resistance, drainage and thickness.

So far our plant has not had sufficient steel to work on a 24-hour-day basis, but we are now operating 16 hours, producing 100 bathtubs and 70 to 75 sinks per day.

## Sign convention is big success

*(Continued from Page 29)*

Products Consolidated, Seattle, as chairman. Featured speakers were R. S. Williams, supervisor of dealer merchandising, International Harvester Company, Chicago; J. M. Jones, manager, Outdoor Department, McCann-Erickson, Inc., New York City; and C. P. Fisken, president, Sales Counselors, Inc., Detroit.

Williams started the meeting off at a lively clip by inserting in his talk a high percentage of spontaneous wit.

Jones, of McCann-Erickson, who received a thorough schooling in signs through his connection with Walker and Company for a number of years, said "It's time to get your business out of bed again to meet the problems of the new day. The replacement market for new signs has never been so great. There are new stores and new building of all kinds.

"But," he said, "you've got to get your business out of the right side of the bed." Old sales and operating habits are the wrong side; creative selling and approach will lead to a productive and highly profitable business. Now is the time to determine policy for we will be entering the most highly competitive market in sign business history. There will be thousands of new sign firms. Sign companies will be either on the side of *cheap prices* or *better "creative selling."*

Mr. Jones cited a growing trend to objections to the use of projecting signs through local ordinances, etc. He suggested that for every projecting sign condemned, a new store front or facade will be required and that — "He who opposes change, opposes his own future." Start this year with "a determination to revitalize and re-pattern for new business." The right way ahead leads out from the right side of the bed of wartime activity.

Prior to the formation of his present firm, Fisken was, for thirty-two years, in advertising and sales pro-

*to Page 64 →*

# OUR ENAMELING EXPERIENCE...

(LEARNED THE HARD WAY)

# IS YOURS

FOR THE ASKING

● Because our college-trained ceramic engineers add to their knowledge by actually working in our own job enameling plant . . . because they are carefully trained and completely familiar with every phase of frit production and use . . . because they have been of service to other companies with problems similar to yours . . . they are qualified to counsel you on production matters.

They have learned the hard way. This expert knowledge is at your command, without obligation to you. Write us, and we will gladly send experienced Ing-Rich ceramic engineers to consult with you for improved results.

ING-RICH

PORCELFRIT

"The Plant Tested Frit"

INGRAM-RICHARDSON MFG. CO., OF INDIANA, INC.

OFFICES, LABORATORY AND PLANT, FRANKFORT, INDIANA

# MONEY ISN'T EVERYTHING-

## (OR IS IT?)

**BY GROUCHO MARX**

WHAT do you want to save up a lot of money for? You'll never need the stuff.

Why, just think of all the wonderful, wonderful things you can do *without* money. Things like—well, things like—

On second thought, you'd better keep on saving, chum. Otherwise you're licked.

For instance, how are you ever going to build that Little Dream House, without a trunk full of moolah? You think the carpenters are going to work free? Or the plumbers? Or the architects? Not those lads. They've been around. They're no dopes.

And how are you going to send that kid of yours to college, without the folding stuff? Maybe you

think he can work his way through by playing the flute. If so, you're crazy. (Only three students have ever worked their way through college by playing the flute. And they had to stop eating for four years.)

And how are you going to do that world-traveling you've always wanted to do? Maybe you think you can stoke your way across, or scrub decks. Well, that's no good. I've tried it. It interferes with shipboard romances.

So—all seriousness aside—you'd better keep on saving, pal.

Obviously the best way is by continuing to buy U. S. Savings Bonds—through the Payroll Plan.

They're safe and sound. Old Uncle Sam *personally*

guarantees your investment. And he never fobbed off a bum I.O.U. on *anybody*.

You get four bucks back for every three you put in. And that ain't hay, alfalfa, or any other field-grown product.

Millions of Americans—smart cookies all—have found the Payroll Plan the easiest and best way to save.

So stick with the Payroll Plan, son—and you can't lose.

**SAVE THE EASY WAY... BUY YOUR BONDS THROUGH PAYROLL SAVINGS**

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## WE ARE BOASTING

**In 1946, the Vitreous plant was running full time on a two shift per day schedule**

**During 1946, we had only TWO lost-time accidents**

**Translate these careful operations into production results and it is quite evident why VITREO porcelain enameled parts are known by every user as "top quality"**

**A busy shop with two lost-time accidents in a year is well equipped, well staffed, and capable of doing the finest work**

**May we prove this to you? Send us your inquiry for complete parts or for enameling only**

**VITREOUS STEEL PRODUCTS CO.**

BOX 1791, CLEVELAND 5, OHIO *(Factory at Nappanee, Ind.)*